Operating Instructions

VEGABAR 52

Profibus PA

Document ID:
36719

Process pressure

Contents

1 About this document

1.1 Function 4
1.2 Target group 4
1.3 Symbolism used 4

2 For your safety

2.1 Authorised personnel 5
2.2 Appropriate use 5
2.3 Warning about misuse 5
2.4 General safety instructions 5
2.5 Safety label on the instrument 6
2.6 CE conformity 6
2.7 Measuring range - permissible process pressure 6
2.8 Fulfillment of NAMUR recommendations 6
2.9 Safety instructions for Ex areas 6
2.10 Environmental instructions 6

3 Product description

3.1 Structure 7
3.2 Principle of operation 8
3.3 Operation 9
3.4 Packaging, transport and storage 10
3.5 Accessories and replacement parts 10

4 Mounting

4.1 General instructions 12
4.2 Mounting steps 14
4.3 Mounting steps, external housing 14

5 Connecting to power supply

5.1 Preparing the connection 16
5.2 Connection procedure 17
5.3 Wiring plan, single chamber housing 19
5.4 Wiring plan, double chamber housing 20
5.5 Wiring plan, double chamber housing Ex d 22
5.6 Wiring plan - version IP 66/IP 68, 1 bar 24
5.7 Wiring plan, external housing with version IP 68 24
5.8 Switch-on phase 26

6 Set up with the indicating and adjustment module PLICSCOM

6.1 Short description 28
6.2 Insert indicating and adjustment module 28
6.3 Adjustment system 30
6.4 Menu schematic 31
6.5 Saving the parameter adjustment data 33

36719-EN-120324

7 Set up with PACTware and other adjustment programs

7.1 Connect the PC via VEGACONNECT 34
7.2 Parameter adjustment with PACTware 35
7.3 Parameter adjustment with PDM 35
7.4 Saving the parameter adjustment data 35

8 Maintenance and fault rectification

8.1 Maintenance 36
8.2 Remove interferences 36
8.3 Calculation of total deviation (according to DIN 16086) 38
8.4 Exchanging the electronics module 40
8.5 Software update 40
8.6 Instrument repair 41

9 Dismounting

9.1 Dismounting steps 42
9.2 Disposal 42

10 Supplement

10.1 Technical data 43
10.2 Information on Profibus PA 53
10.3 Dimensions 58

Supplementary documentation

Information:
Supplementary documents appropriate to the ordered version come with the delivery. You can find them listed in chapter "*Product description*".

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36719-EN-120324

1 About this document

1.1 Function

This operating instructions manual provides all the information you need for mounting, connection and setup as well as important instructions for maintenance and fault rectification. Please read this information before putting the instrument into operation and keep this manual accessible in the immediate vicinity of the device.

1.2 Target group

This operating instructions manual is directed to trained qualified personnel. The contents of this manual should be made available to these personnel and put into practice by them.

1.3 Symbolism used

Information, tip, note
This symbol indicates helpful additional information.

Caution: If this warning is ignored, faults or malfunctions can result.
Warning: If this warning is ignored, injury to persons and/or serious damage to the instrument can result.
Danger: If this warning is ignored, serious injury to persons and/or destruction of the instrument can result.

Ex applications
This symbol indicates special instructions for Ex applications.

- **List**
  The dot set in front indicates a list with no implied sequence.

→ **Action**
This arrow indicates a single action.

1 **Sequence**
Numbers set in front indicate successive steps in a procedure.

2 For your safety

2.1 Authorised personnel

All operations described in this operating instructions manual must be carried out only by trained specialist personnel authorised by the plant operator.

During work on and with the device the required personal protective equipment must always be worn.

2.2 Appropriate use

VEGABAR 52 is a pressure transmitter for measurement of gauge pressure, absolute pressure and vacuum.

You can find detailed information on the application range in chapter "*Product description*".

Operational reliability is ensured only if the instrument is properly used according to the specifications in the operating instructions manual as well as possible supplementary instructions.

For safety and warranty reasons, any invasive work on the device beyond that described in the operating instructions manual may be carried out only by personnel authorised by the manufacturer. Arbitrary conversions or modifications are explicitly forbidden.

2.3 Warning about misuse

Inappropriate or incorrect use of the instrument can give rise to application-specific hazards, e.g. vessel overfill or damage to system components through incorrect mounting or adjustment.

2.4 General safety instructions

This is a high-tech instrument requiring the strict observance of standard regulations and guidelines. The user must take note of the safety instructions in this operating instructions manual, the country-specific installation standards as well as all prevailing safety regulations and accident prevention rules.

The instrument must only be operated in a technically flawless and reliable condition. The operator is responsible for trouble-free operation of the instrument.

During the entire duration of use, the user is obliged to determine the compliance of the necessary occupational safety measures with the current valid rules and regulations and also take note of new regulations.

2.5 Safety label on the instrument

The safety approval markings and safety tips on the device must be observed.

2.6 CE conformity

This device fulfills the legal requirements of the applicable EC guidelines. By attaching the CE mark, VEGA provides a confirmation of successful testing. You can find the CE conformity declaration in the download area of "www.vega.com".

2.7 Measuring range - permissible process pressure

Due to the application, a measuring cell with a measuring range higher than the permissible pressure range of the process fitting may have been integrated. The permissible process pressure is stated with "Process pressure" on the type label, see chapter 3.1 "*Configuration*". For safety reasons, this range must not be exceeded.

2.8 Fulfillment of NAMUR recommendations

The device fulfills the requirements of the applicable NAMUR recommendations.

2.9 Safety instructions for Ex areas

Please note the Ex-specific safety information for installation and operation in Ex areas. These safety instructions are part of the operating instructions manual and come with the Ex-approved instruments.

2.10 Environmental instructions

Protection of the environment is one of our most important duties. That is why we have introduced an environment management system with the goal of continuously improving company environmental protection. The environment management system is certified according to DIN EN ISO 14001.

Please help us fulfil this obligation by observing the environmental instructions in this manual:

- Chapter "*Packaging, transport and storage*"
- Chapter "*Disposal*"

3 Product description

3.1 Structure

Scope of delivery

The scope of delivery encompasses:

- VEGABAR 52 pressure transmitter
- Documentation
  - this operating instructions manual
  - Test certificate for pressure transmitters
  - Ex specific safety instructions (with Ex versions), if necessary further certificates
  - Operating instructions manual 27835 "*Indicating and adjustment module PLICSCOM*" (optional)
  - Supplementary instructions manual 31708 "*Heating for indicating and adjustment module*" (optional)
  - Supplementary instructions manual "*Plug connector for continuously measuring sensors*" (optional)

Constituent parts

The VEGABAR 52 consists of the components:

- Process fitting with measuring cell
- Housing with electronics, optionally available with plug connector
- Housing cover, optionally available with indicating and adjustment module PLICSCOM

The components are available in different versions.

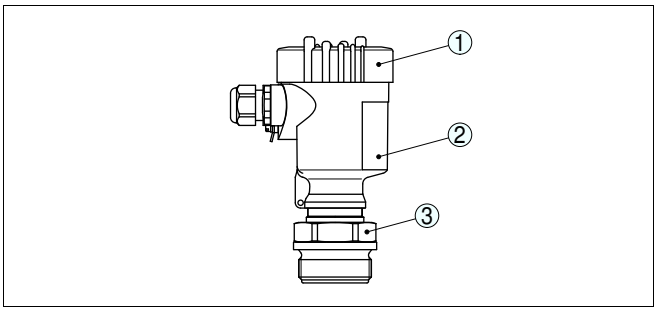


Fig. 1: Example of a VEGABAR 52 with process fitting G1½ A and plastic housing

1 Housing cover with integrated PLICSCOM (optional)
2 Housing with electronics
3 Process fitting with measuring cell

Type label

The type label contains the most important data for identification and use of the instrument:

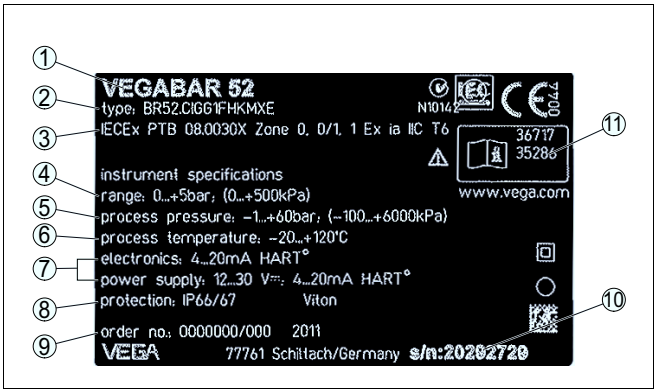


Fig. 2: Structure of the type label (example)

1 Instrument type
2 Product code
3 Approvals
4 Electronics
5 Protection rating
6 Measuring range
7 Process and ambient temperature, process pressure
8 Material, wetted parts
9 Hardware and software version
10 Order number
11 Serial number of the instrument
12 ID numbers, instrument documentation

With the serial number, you can access the delivery data of the instrument via www.vega.com, "*VEGA Tools*" and "*serial number search*". In addition to the type label outside, you can also find the serial number on the inside of the instrument.

3.2 Principle of operation

Application area

VEGABAR 52 is a pressure transmitter for use in the paper, food processing and pharmaceutical industries as well as in water/sewage water plants. Depending on the version, it is used for level, gauge, absolute pressure or vacuum measurement. Measured products are gases, vapours and liquids, also those containing abrasive substances.

Functional principle

Sensor element is the CERTEC® measuring cell with robust, dependent on the process fitting also front-flush, abrasion-resistant ceramic diaphragm. The process pressure causes a capacitance change in the measuring cell via the ceramic diaphragm. This change is converted into an appropriate output signal and outputted as measured value.

The CERTEC® measuring cell is also equipped with a temperature sensor. The temperature value can be displayed via the indicating and adjustment module as well as processed via the signal output (with digital versions).

Seal concept

As a standard feature, the CERTEC® measuring cell is equipped with a lateral, recessed seal.

Instruments with double seal have an additional front seal.

Instruments with hygienic fitting are equipped with a gap-free form seal.

Power supply and bus communication

Power supply via the Profibus DP/PA segment coupler or VEGALOG 571 EP cards. A two-wire cable according to Profibus specification serves as carrier of both power and digital data transmission for multiple sensors. The instrument profile of VEGABAR 52 corresponds to profile specification version 3.0.

The backlight of the indicating and adjustment module is powered by the sensor. Prerequisite is a certain level of operating voltage.

The data for power supply are specified in chapter "*Technical data*".

The optional heating requires its own operating voltage. You can find details in the supplementary instructions manual "*Heating for indicating and adjustment module*".

This function is generally not available for approved instruments.

GSD/EDD

The GSD (instrument master files) and bitmap files necessary for planning your Profibus-DP-(PA) communication network are available from the download section on the VEGA homepage www.vega.com under "*Services - Downloads - Software - Profibus*". There you can also find the appropriate certificates. In a PDM environment, an EDD (Electronic Device Description) is also required to enable the full range of sensor functions (also available as a download).A CD with the appropriate files can be ordered via e-mail under info@de.vega.com or by phone from one of the VEGA agencies under the order number "DRIVER.S".

3.3 Operation

The instrument can be adjusted with the following adjustment media:

- With indicating and adjustment module
- with the suitable VEGA DTM in conjunction with an adjustment software according to the FDT/DTM standard, e.g. PACTware and PC
- with the adjustment program PDM

3.4 Packaging, transport and storage

Packaging

Your instrument was protected by packaging during transport. Its capacity to handle normal loads during transport is assured by a test according to DIN EN 24180.

The packaging of standard instruments consists of environment-friendly, recyclable cardboard. For special versions, PE foam or PE foil is also used. Dispose of the packaging material via specialised recycling companies.

Transport

Transport must be carried out under consideration of the notes on the transport packaging. Nonobservance of these instructions can cause damage to the device.

Transport inspection

The delivery must be checked for completeness and possible transit damage immediately at receipt. Ascertained transit damage or concealed defects must be appropriately dealt with.

Storage

Up to the time of installation, the packages must be left closed and stored according to the orientation and storage markings on the outside.

Unless otherwise indicated, the packages must be stored only under the following conditions:

- Not in the open
- Dry and dust free
- Not exposed to corrosive media
- Protected against solar radiation
- Avoiding mechanical shock and vibration

Storage and transport temperature

- Storage and transport temperature see chapter "*Supplement - Technical data - Ambient conditions*"
- Relative humidity 20 … 85 %

3.5 Accessories and replacement parts

Indicating and adjustment module

The indicating and adjustment module PLICSCOM is used for measured value indication, adjustment and diagnosis. It can be inserted into the sensor and removed at any time.

You can find further information in the operating instructions "*Indicating and adjustment module PLICSCOM*" (Document-ID 27835).

Interface adapter

The interface adapter VEGACONNECT 4 enables the connection of communication-capable instruments to the USB interface of a PC. For parameter adjustment of these instruments, an adjustment software such as PACTware with VEGA-DTM is required.

You can find further information in the operating instructions "*Interface adapter VEGACONNECT*" (Document-ID 32628).

36719-EN-120324

External indicating and adjustment unit

VEGADIS 61 is suitable for external measured value indication and adjustment of plics® sensors. It is connected to the sensor with an up to 25 m long, four-wire, screened standard cable.

You can find further information in the operating instructions "*VEGADIS 61*" (Document-ID 27720).

Flanges

Flanges are available in different versions according to the following standards: DIN 2501, EN 1092-1, ANSI B 16.5, JIS B 2210-1984, GOST 12821-80.

You can find additional information in the supplementary instructions manual "*Flanges according to DIN-EN-ASME-JIS*" (Document-ID 31088).

Measuring instrument holder

The measuring instrument holder is used for wall/tube mounting of VEGABAR series 50 pressure transmitters and VEGAWELL 52 suspension pressure transmitters. Supplied reducers enable the adaptation to different instrument diameters. The material used is 316L.

Protective cover

The protective cover protects the sensor housing against soiling and intense heat from solar radiation.

You will find additional information in the supplementary instructions manual "*Protective cover*" (Document-ID 34296).

Electronics module

The electronics module is a replacement part for pressure transmitter VEGABAR. One version is available for each type of signal output.

You find further information in the operating instructions "*Electronics module VEGABAR series 50 and 60* " (Document-ID 30175).

4 Mounting

4.1 General instructions

Suitability for the process conditions

Make sure that all parts of the instrument exposed to the process, in particular the sensor element, process seal and process fitting, are suitable for the existing process conditions. These include above all the process pressure, process temperature as well as the chemical properties of the medium.

You can find the specifications in chapter "*Technical data*" and on the type label.

Mounting position

Select an installation position you can easily reach for mounting and connecting as well as later retrofitting of an indicating and adjustment module. The housing can be rotated by 330° without the use of any tools. You can also install the indicating and adjustment module in four different positions (each displaced by 90°).

Moisture

Use the recommended cables (see chapter "*Connecting to power supply*") and tighten the cable gland.

You can give your instrument additional protection against moisture penetration by leading the connection cable downward in front of the cable entry. Rain and condensation water can thus drain off. This applies mainly to outdoor mounting as well as installation in areas where high humidity is expected (e.g. through cleaning processes) or on cooled or heated vessels.

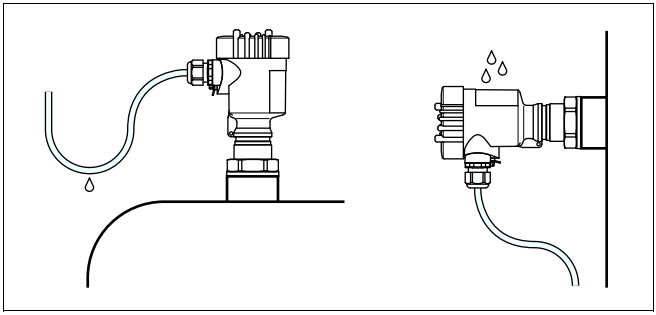


Fig. 3: Measures against moisture penetration

Ventilation and pressure compensation

The ventilation of the electronics housing as well as the atmospheric pressure compensation for the measuring cell are realised via a filter element in the area of the cable gland.

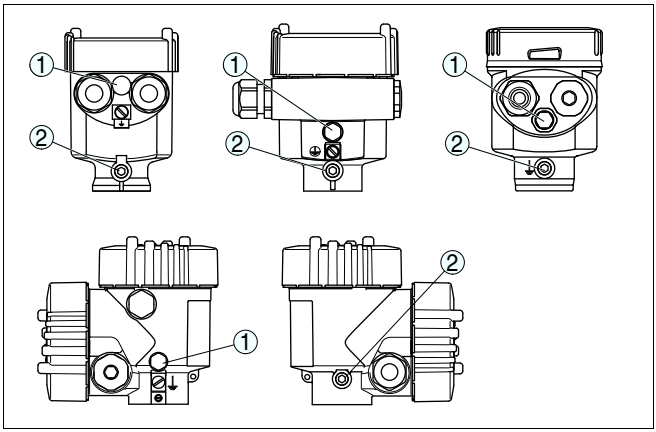


Fig. 4: Position of the filter element

1 Filter element
2 Blind stopper

Caution:
Due to the filter effect, the pressure compensation is time delayed. When opening/closing the housing cover quickly, the measured value can change for a period of approx. 5 s by up to 15 mbar.

Information:
Make sure that the filter element is always free of buildup during operation. A high-pressure cleaner may not be used for cleaning.

With instrument versions in protection IP 66/IP 68, 1 bar, the ventilation is realised via the capillaries in the permanently connected cable. The filter element is replaced by a blind stopper.

Temperature limits

Higher process temperatures often mean also higher ambient temperatures. Make sure that the upper temperature limits stated in chapter "*Technical data*" for the environment of the electronics housing and connection cable are not exceeded.

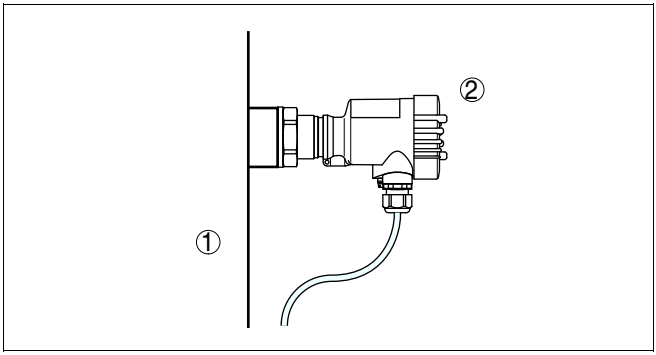


Fig. 5: Temperature ranges

1 Process temperature
2 Ambient temperature

4.2 Mounting steps

Welding the socket

For mounting VEGABAR 52, a welded socket is required. You can find these components in the supplementary instructions manual "*Welded socket and seals*".

Sealing/Screwing in threaded versions

Seal the thread with teflon, hemp or a similar resistant seal material on the process fitting thread 1½ NPT.

→ Screw VEGABAR 52 into the welded socket. Tighten the hexagon on the process fitting with a suitable wrench. Wrench size, see chapter "*Dimensions*".

Warning:
The housing must not be used to screw the instrument in! Applying tightening force can damage internal parts of the housing.

Sealing/Screwing in flange versions

Seal the flange connections according to DIN/ANSI with a suitable, resistant seal and mount VEGABAR 52 with suitable screws.

Sealing/Screwing in hygienic fittings

Use the seal suitable for the respective process fitting. You can find the components in the supplementary instructions manual "*Welded socket and seals*".

4.3 Mounting steps, external housing

Wall mounting

1 Mark the holes according to the following drilling template
2 Depending on the mounting surface, fasten the wall mounting plate with 4 screws

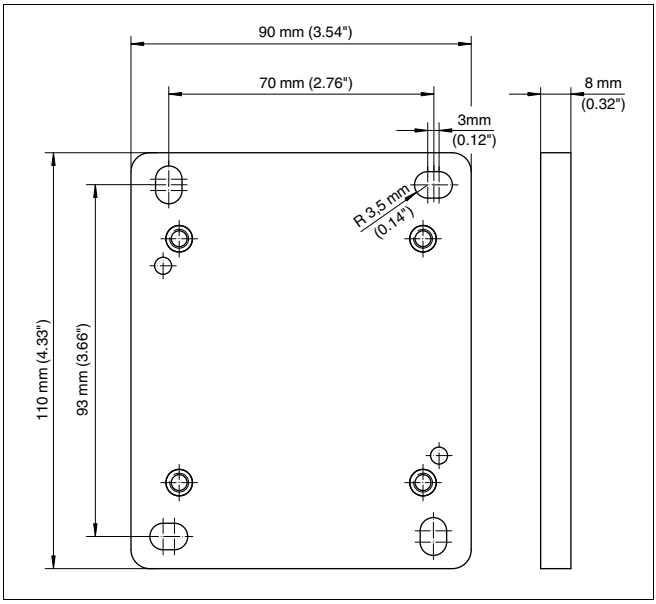


Fig. 6: Drilling template - wall mounting plate

Tip:
Mount the wall mounting plate so that the cable entry of the socket housing points downward. The socket housing can be displaced by 180° to the wall mounting plate.

Warning:
The four screws of the socket housing must only be hand screwed. A torque > 5 Nm (3.688 lbf ft) can damage the wall mounting plate.

5 Connecting to power supply

5.1 Preparing the connection

Safety instructions

Always keep in mind the following safety instructions:

- Connect only in the complete absence of line voltage
- If voltage surges are expected, overvoltage arresters should be installed according to Profibus specifications

Tip:
We recommend VEGA overvoltage arrester B63-32.

In hazardous areas you must take note of the respective regulations, conformity and type approval certificates of the sensors and power supply units.

Voltage supply

Power is supplied via a Profibus DP/PA segment coupler or a VEGALOG 571 EP input card. The power supply range can differ depending on the instrument version.

The data for power supply are specified in chapter "*Technical data*".

Connection cable

Connection is made with screened cable according to the Profibus specification. Power supply and digital bus signal are carried over the same two-wire connection cable.

Use cable with round cross-section. A cable outer diameter of 5 … 9 mm (0.2 … 0.35 in) ensures the seal effect of the cable gland. If you are using cable with a different diameter or cross-section, exchange the seal or use a suitable cable gland.

Please make sure that your installation is carried out according to the Profibus specification. In particular, make sure that the termination of the bus is done with appropriate terminating resistors.

Cable gland ½ NPT

On the instrument with cable entry ½ NPT and plastic housing there is a metallic ½" threaded insert moulded into the plastic housing.

Caution:
No grease should be used when screwing the NPT cable gland or steel tube into the threaded insert. Standard grease can contain additives that corrode the connection between threaded insert and housing. This would influence the stability of the connection and the tightness of the housing.

Cable screening and grounding

With systems with potential equalisation, connect the cable screen directly to ground potential at the power supply unit, in the connection box and at the sensor. The screen in the sensor must be connected directly to the internal ground terminal. The ground terminal outside on the housing must be connected to the potential equalisation (low impedance).

In systems without potential equalisation, connect the cable screen directly to ground potential at the power supply unit and at the sensor. In the connection box or T-distributor, the screen of the short stub to the sensor must not be connected to ground potential or to another cable screen. The cable screens to the power supply unit and to the next distributor must be connected to each other and also connected to ground potential via a ceramic capacitor (e.g. 1 nF, 1500 V). Low-frequency potential equalisation currents are thus suppressed, but the protective effect against high frequency interference signals remains.

The total capacitance of the cable and of all capacitors must not exceed 10 nF in Ex applications.

Take note of the corresponding installation regulations for Ex applications. In particular, make sure that no potential equalisation currents flow over the cable screen. In case of grounding on both sides this can be achieved by the use of a capacitor or a separate potential equalisation.

5.2 Connection procedure

Single/Double chamber housing

Proceed as follows:

1. Unscrew the housing cover
2. If an indicating and adjustment module is installed, remove it by turning it to the left.
3. Loosen compression nut of the cable entry
4. Remove approx. 10 cm of the cable mantle, strip approx. 1 cm insulation from the individual wires
5. Insert the cable into the sensor through the cable entry
6. Lift the opening levers of the terminals with a screwdriver (see following illustration)
7. Insert the wire ends into the open terminals according to the wiring plan
8. Press down the opening levers of the terminals, you will hear the terminal spring closing
9. Check the hold of the wires in the terminals by lightly pulling on them
10. Connect the screen to the internal ground terminal, connect the outer ground terminal to potential equalisation
11. Tighten the compression nut of the cable entry. The seal ring must completely encircle the cable
12. Screw the housing cover back on

The electrical connection is finished.

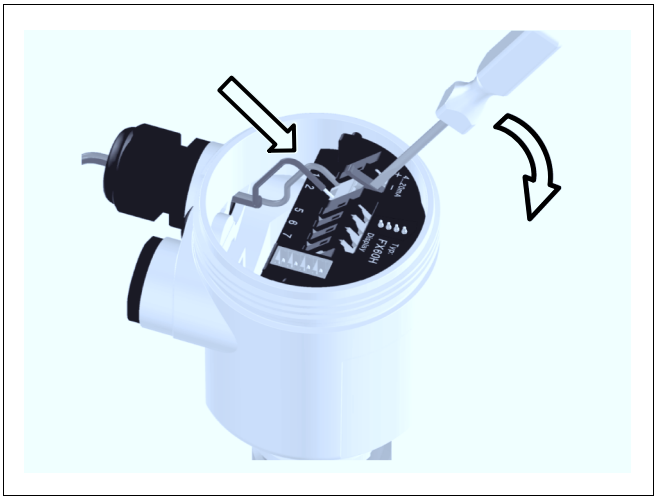


Fig. 7: Connection steps 6 and 7

IP 68 version with external housing

Proceed as follows:

1 Loosen the four screws on the housing base with an Allen key size 4

2 Remove the housing socket from the mounting plate

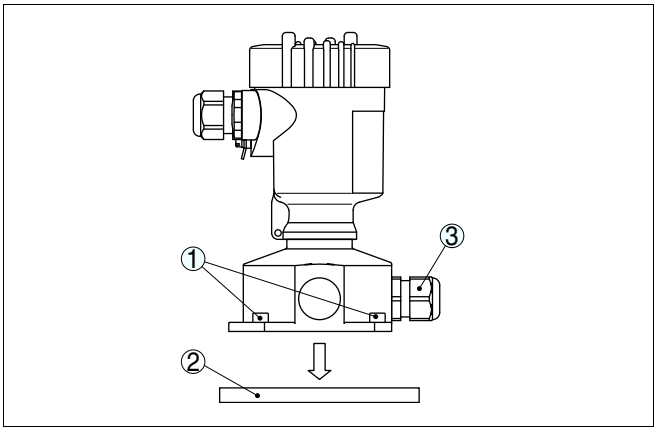


Fig. 8: Components of the external housing

1 Screws
2 Wall mounting plate
3 Cable gland

3 Loop the connection cable through the cable entry on the housing base[1)]

Information:
The cable gland can be mounted in three positions each displaced by 90°. Simply exchange the cable gland against the blind plug in the suitable thread opening.

4 Connect the wire ends as described under "*Single/Double chamber housing*" according to the numbering

5 Connect the screen to the internal ground terminal, connect the outer ground terminal above on the housing to potential equalisation

6 Tighten the compression nut of the cable entry. The seal ring must completely encircle the cable

7 Attach the mounting plate again and tighten the screws

The electrical connection of the sensor to the external housing is finished.

5.3 Wiring plan, single chamber housing

The following illustrations apply to the non-Ex as well as to the Ex-ia version.

[1)] The connection cable is already preconfectioned. If necessary, shorten it to the requested length, cut the breather capillaries clean. Remove approx. 5 cm of the cable mantle, strip approx. 1 cm insulation from the ends of the individual wires. After shortening the cable, fasten the type plate with support back onto the cable.

Electronics and connection compartment

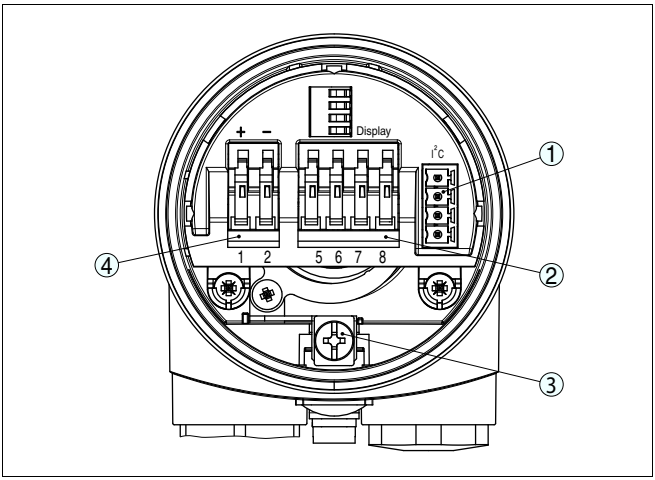


Fig. 9: Electronics and connection compartment, single chamber housing

1 Plug connector for VEGACONNECT (I^2C interface)
2 Spring-loaded terminals for connection of the external indication VEGADIS 61
3 Ground terminal for connection of the cable screen
4 Spring-loaded terminals for voltage supply

Wiring plan

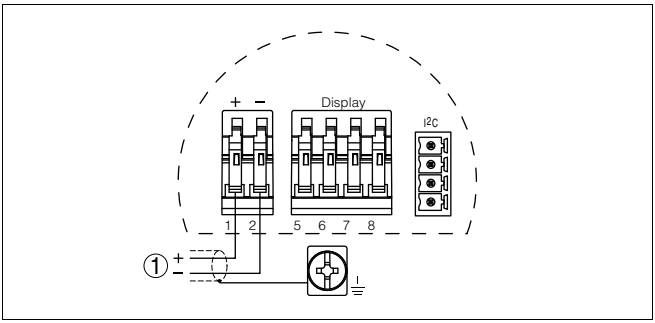


Fig. 10: Wiring plan, single chamber housing

1 Voltage supply, signal output

5.4 Wiring plan, double chamber housing

The following illustrations apply to the non-Ex as well as to the Ex-ia version.

Electronics compartment

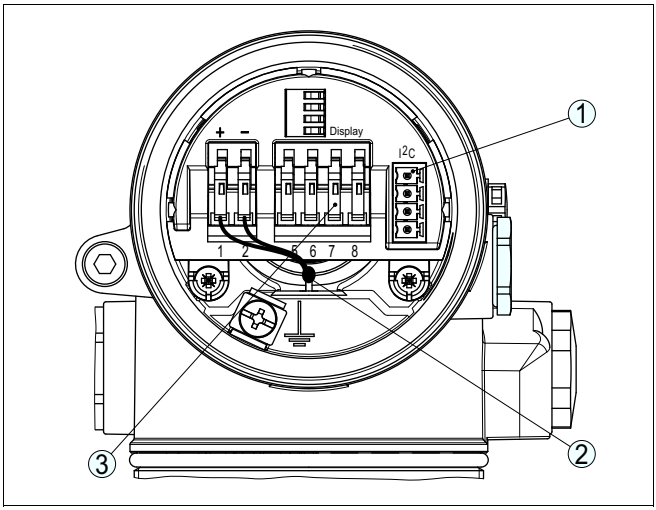


Fig. 11: Electronics compartment, double chamber housing

1 Plug connector for VEGACONNECT (I^2C interface)
2 Internal connection cable to the connection compartment
3 Terminals for VEGADIS 61

Connection compartment

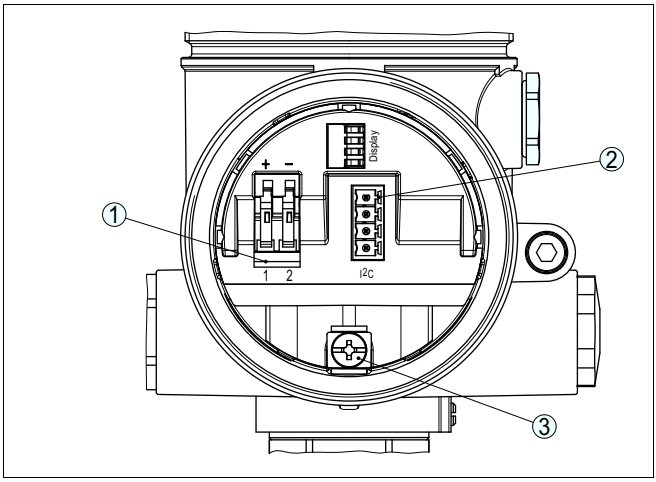


Fig. 12: Connection compartment double chamber housing

1 Spring-loaded terminals for voltage supply
2 Plug connector for VEGACONNECT (I^2C interface)
3 Ground terminal for connection of the cable screen

Wiring plan

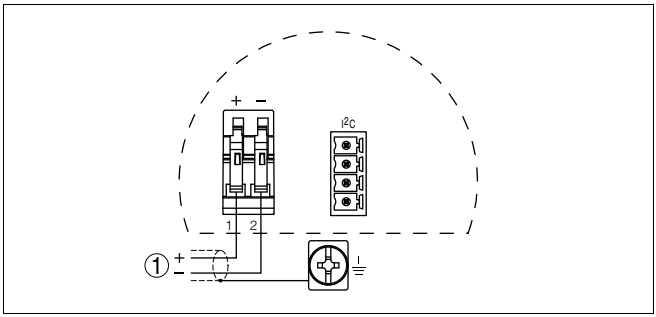


Fig. 13: Wiring plan, double chamber housing

1 Voltage supply, signal output

5.5 Wiring plan, double chamber housing Ex d

Electronics compartment

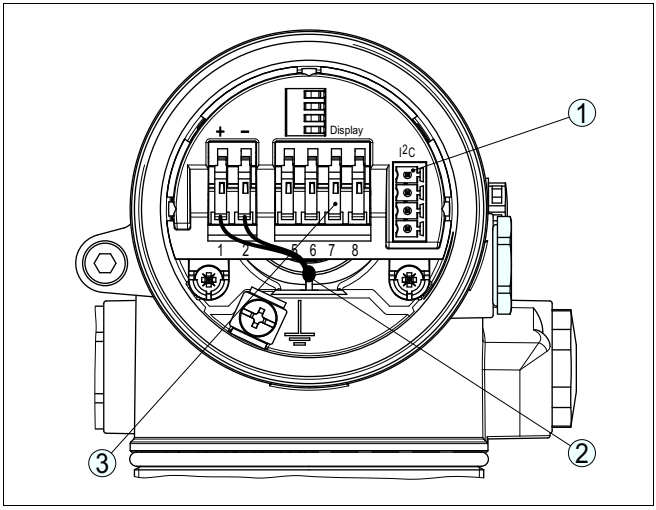


Fig. 14: Electronics compartment, double chamber housing

1 Plug connector for VEGACONNECT (I^2C interface)
2 Internal connection cable to the connection compartment
3 Terminals for VEGADIS 61

Connection compartment

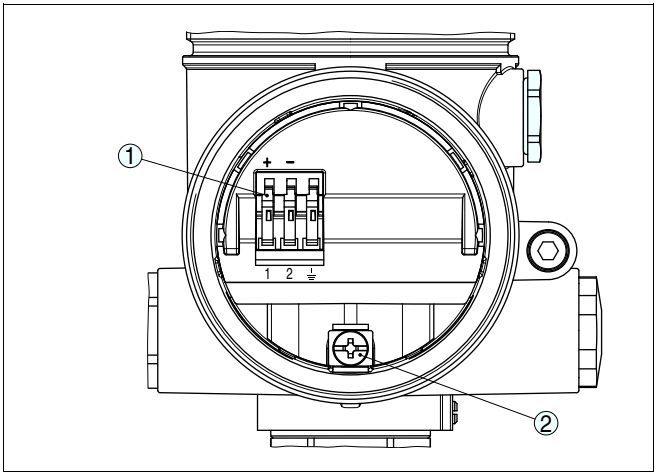


Fig. 15: Connection compartment, Ex-d double chamber housing

1 Spring-loaded terminals for power supply and cable screen
2 Ground terminal for connection of the cable screen

Wiring plan

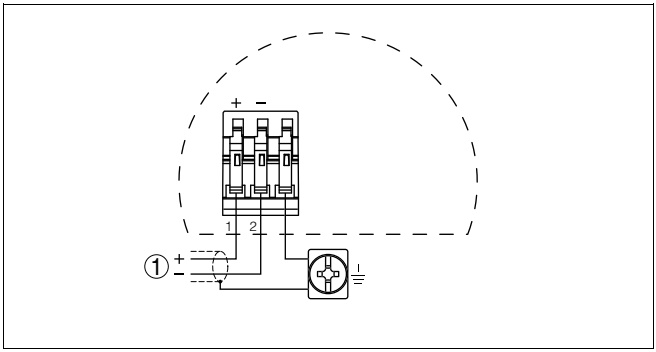


Fig. 16: Wiring plan, Ex-d double chamber housing

1 Voltage supply, signal output

5.6 Wiring plan - version IP 66/IP 68, 1 bar

Wire assignment connection cable

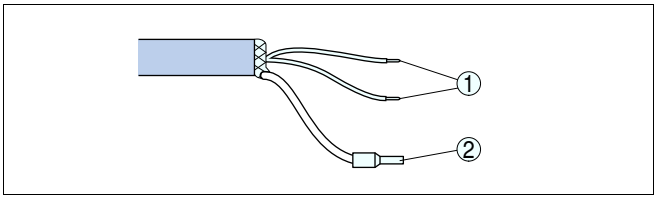


Fig. 17: Wire assignment connection cable

1 brown (+) and blue (-) to power supply or to the processing system
2 Shielding

5.7 Wiring plan, external housing with version IP 68

Overview

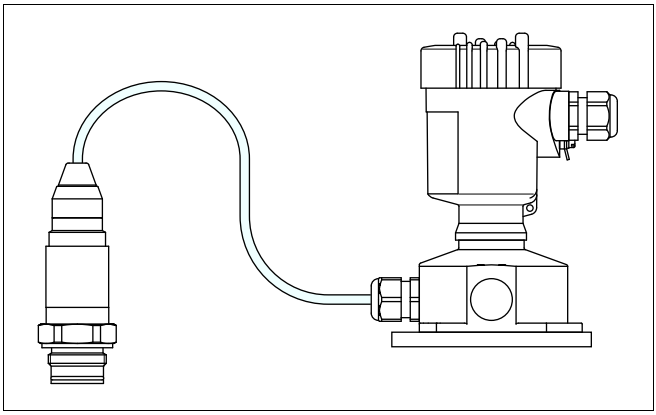


Fig. 18: VEGABAR 52 in IP 68 version 25 bar and axial cable outlet, external housing

Electronics and connection compartment for power supply

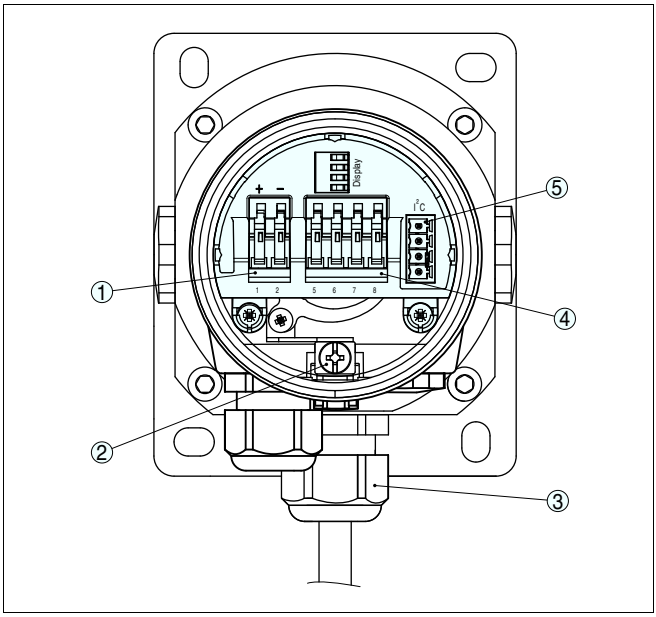


Fig. 19: Electronics and connection compartment

1 *Spring-loaded terminals for voltage supply*
2 *Ground terminal for connection of the cable screen*
3 *Cable gland to the process component*
4 *Spring-loaded terminals for connection of the external indication VEGADIS 61*
5 *Plug connector for VEGACONNECT (I^2C interface)*

Terminal compartment, housing socket

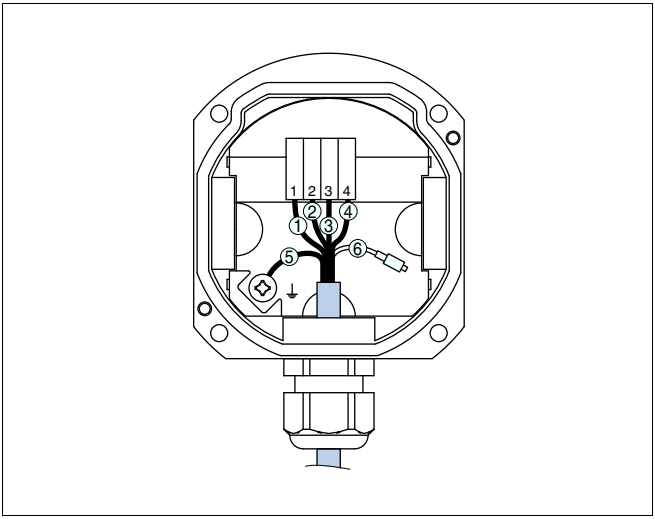


Fig. 20: Connection of the sensor in the housing socket

1 Brown
2 Blue
3 Yellow
4 White
5 Shielding
6 Breather capillaries

Wiring plan external electronics

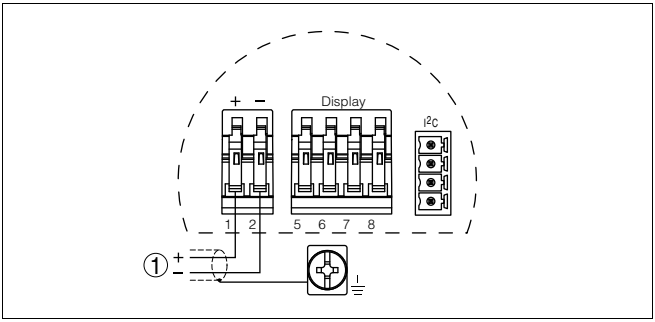


Fig. 21: Wiring plan external electronics

1 Voltage supply

5.8 Switch-on phase

Switch-on phase

After VEGABAR 52 is connected to voltage supply or after voltage recurrence, the instrument carries out a self-check for approx. 30 seconds. The following steps are carried out:

- Internal check of the electronics
- Indication of the instrument type, the firmware as well as the sensor TAGs (sensor designation)
- Status byte goes briefly to fault value

Then the current measured value will be displayed and the corresponding digital output signal will be outputted to the cable.[2)]

[2)] The values correspond to the actual measured level as well as to the settings already carried out, e.g. default setting.

6 Set up with the indicating and adjustment module PLICSCOM

6.1 Short description

Function/Configuration

The indicating and adjustment module is used for measured value display, adjustment and diagnosis. It can be mounted in the following housing versions and instruments:

- All sensors of the plics® instrument family, in the single as well as in the double chamber housing (optionally in the electronics or connection compartment)
- External indicating and adjustment unit VEGADIS 61

From a hardware version …- 01 or higher of the indicating and adjustment module resp. …- 03 or higher of the corresponding sensor electronics, an integrated backlight can be switched on via the adjustment menu. The hardware version is stated on the type label of the indicating and adjustment module or the sensor electronics.

Note:
You can find detailed information on the adjustment in the operating instructions manual "*Indicating and adjustment module*".

6.2 Insert indicating and adjustment module

Mount/Dismount indicating and adjustment module

The indicating and adjustment module can be inserted into the sensor and removed again at any time. It is not necessary to interrupt the power supply.

Proceed as follows:

1 Unscrew the housing cover
2 Place the indicating and adjustment module in the desired position on the electronics (you can choose any one of four different positions - each displaced by 90°)
3 Press the indicating and adjustment module onto the electronics and turn it to the right until it snaps in.
4 Screw housing cover with inspection window tightly back on

Removal is carried out in reverse order.

The indicating and adjustment module is powered by the sensor, an additional connection is not necessary.

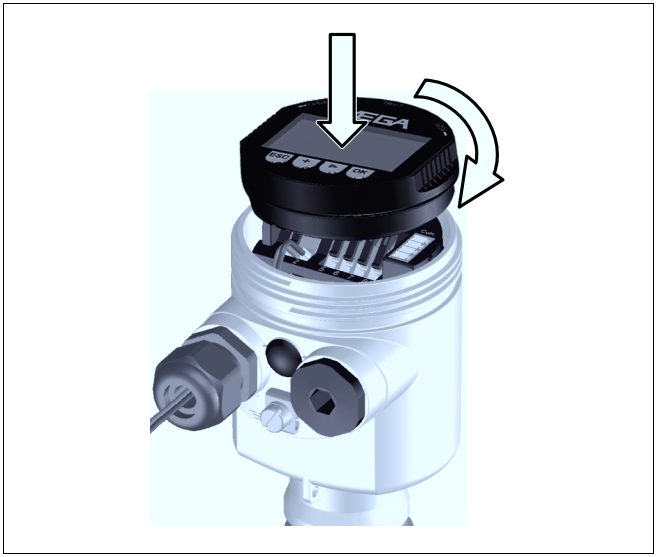


Fig. 22: Insert indicating and adjustment module

Note:
If you intend to retrofit the instrument with an indicating and adjustment module for continuous measured value indication, a higher cover with an inspection glass is required.

6.3 Adjustment system

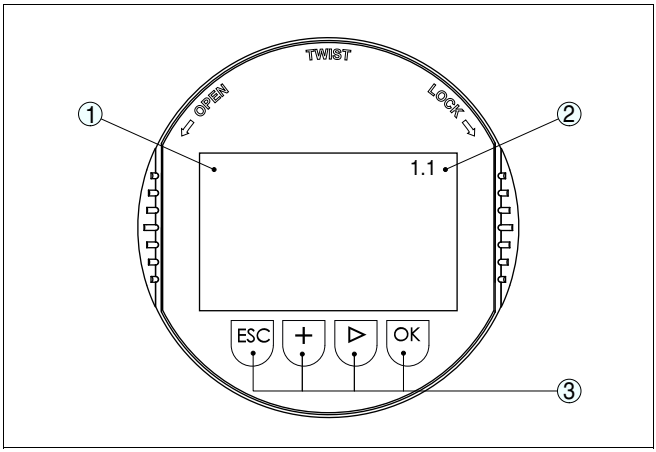


Fig. 23: Indicating and adjustment elements

1 LC display
2 Indication of the menu item number
3 Adjustment keys

Key functions

- ***[OK]*** key:
  - Move to the menu overview
  - Confirm selected menu
  - Edit parameter
  - Save value
- ***[->]*** key to select:
  - Menu change
  - Select list entry
  - Select editing position
- ***[+]*** key:
  - Change value of the parameter
- ***[ESC]*** key:
  - interrupt input
  - Return to higher-ranking menu

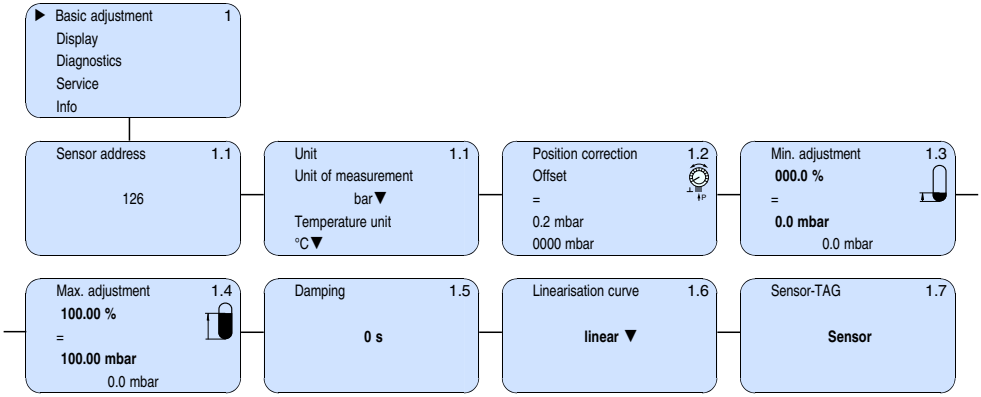
Adjustment system

The sensor is adjusted via the four keys of the indicating and adjustment module. The LC display indicates the individual menu items. The functions of the individual keys are shown in the above illustration. Approx. 10 minutes after the last pressing of a key, an automatic reset to measured value indication is triggered. Any values not confirmed with ***[OK]*** will not be saved.

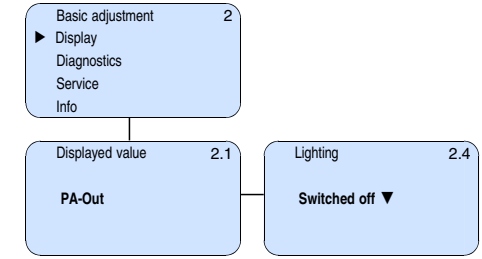
6.4 Menu schematic

Information:
Depending on the version and application, the highlighted menu windows may not always be available.

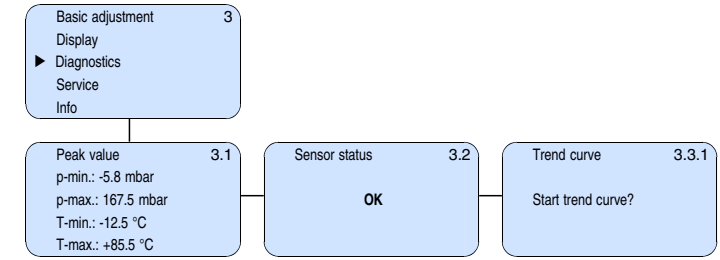
Basic adjustment



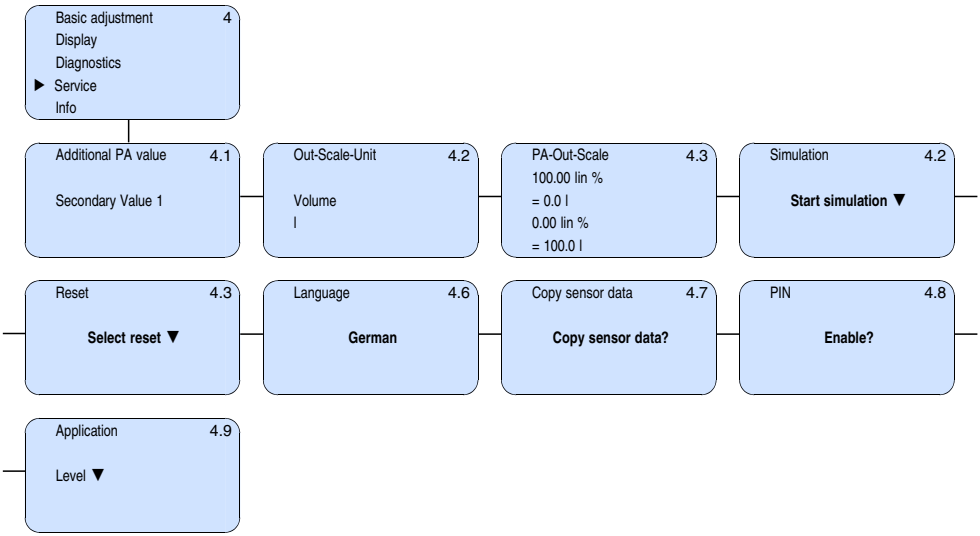
Display



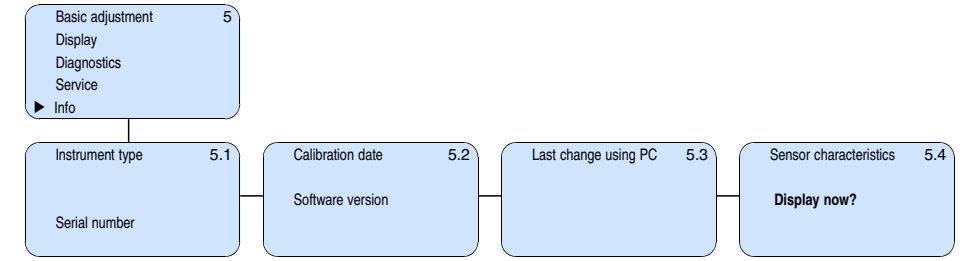
Diagnostics



Service



Info



6.5 Saving the parameter adjustment data

We recommended noting the adjusted data, e.g. in this operating instructions manual, and archiving them afterwards. They are thus available for multiple use or service purposes.

If VEGABAR 52 is equipped with an indicating and adjustment module, the most important data can be read out of the sensor into the indicating and adjustment module. The procedure is described in the operating instructions manual "*Indicating and adjustment module*" in the menu item "*Copy sensor data*". The data remain there permanently even if the sensor power supply fails.

If it is necessary to exchange the sensor, the indicating and adjustment module is inserted into the replacement instrument and the data are written into the sensor under the menu item "*Copy sensor data*".

7 Set up with PACTware and other adjustment programs

7.1 Connect the PC via VEGACONNECT

VEGACONNECT directly on the sensor

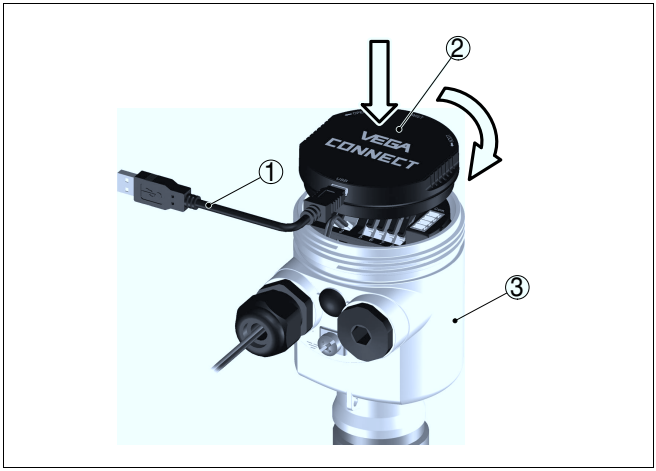


Fig. 24: Connection of the PC via VEGACONNECT directly to the sensor

1 USB cable to the PC
2 VEGACONNECT
3 Sensor

VEGACONNECT externally

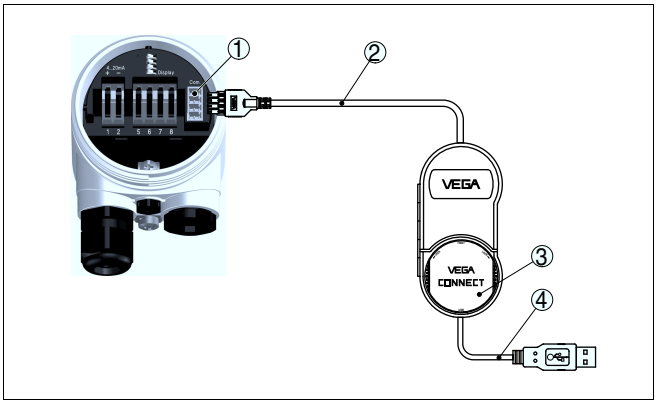


Fig. 25: Connection via VEGACONNECT externally

1 I^2C bus (com.) interface on the sensor
2 I^2C connection cable of VEGACONNECT
3 VEGACONNECT
4 USB cable to the PC

Necessary components:

- VEGABAR 52
- PC with PACTware and suitable VEGA DTM
- VEGACONNECT
- Power supply unit or processing system

7.2 Parameter adjustment with PACTware

Further setup steps are described in the operating instructions manual "*DTM Collection/PACTware*" attached to each CD and which can also be downloaded from our homepage. A detailed description is available in the online help of PACTware and the VEGA DTMs.

Note:
Keep in mind that for setup of VEGABAR 52, DTM-Collection in the actual version must be used.

All currently available VEGA DTMs are included as a DTM Collection on a CD. They can be purchased for a token fee from the responsible VEGA agency. In addition, the actual PACTware version is also available on this CD.

In addition, this DTM Collection incl. the basic version of PACTware can be downloaded free of charge from the Internet. Move via www.vega.com and "*Downloads*" to "*Software*".

7.3 Parameter adjustment with PDM

For VEGA sensors, instrument descriptions for the adjustment program PDM are available as EDD. The instrument descriptions are already implemented in the current version of PDM. For older versions of PDM, a free-of-charge download is available via Internet.

Go via www.vega.com and "*Downloads*" to the item "*Software*".

7.4 Saving the parameter adjustment data

It is recommended to document or save the parameter adjustment data. That way they are available for multiple use or service purposes.

The VEGA DTM Collection and PACTware in the licensed, professional version provide suitable tools for systematic project documentation and storage.

8 Maintenance and fault rectification

8.1 Maintenance

Maintenance

If the instrument is used properly, no special maintenance is required in normal operation.

In some applications, product buildup on the diaphragm can influence the measuring result. Depending on the sensor and application, take precautions to ensure that heavy buildup, and especially a hardening thereof, is avoided.

Cleaning

If necessary, clean the diaphragm. Make sure that the materials are resistant to the cleaning process, see resistance list under "*Services*" on "www.vega.com". The wide variety of applications of isolating diaphragms makes special cleaning instructions necessary for each application. Please ask the VEGA agency serving you.

8.2 Remove interferences

Reaction when malfunctions occur

The operator of the system is responsible for taking suitable measures to rectify faults.

Failure reasons

VEGABAR 52 offers maximum reliability. Nevertheless, faults can occur during operation. These may be caused by the following, e.g.:

- Sensor
- Process
- Voltage supply
- Signal processing

Fault rectification

The first measures to be taken are to check the output signals as well as to evaluate the error messages via the indicating and adjustment module. The procedure is described below. Further comprehensive diagnostics can be carried out on a PC with the software PACTware and the suitable DTM. In many cases, the causes can be determined and the faults rectified this way.

24 hour service hotline

Should these measures not be successful, please call in urgent cases the VEGA service hotline under the phone no. **+49 1805 858550**.

The hotline is available to you 7 days a week round-the-clock. Since we offer this service world-wide, the support is only available in the English language. The service is free of charge, only the standard telephone costs will be charged.

Checking Profibus PA

The following table describes possible errors and helps to remove them:

Error	Cause	Rectification
When an additional instrument is connected, the segment fails.	Max. supply current of the segment coupler exceeded	Measure the current consumption, reduce size of segment
Wrong presentation of the measured value in Simatic S5	Simatic S5 cannot interpret the number format IEEE of the measured value	Insert converting component from Siemens
In Simatic S7 the measured value is always presented as 0	Only four bytes are consistently loaded in the PLC	Use function component SFC 14 to load 5 bytes consistently
Measured value on the indicating and adjustment module does not correspond to the value in the PLC	The menu item "*Display - Display value*" is not set to "*PA-Out*"	Check values and correct, if necessary
No connection between PLC and PA network	Incorrect adjustment of the bus parameter and the segment coupler-dependent baud rate	Check data and correct, if necessary
Instrument does not appear during connection setup	Profibus DP cable pole-reversed	Check cable and correct, if necessary
	Incorrect termination	Check termination at the beginning and end points of the bus and terminate, if necessary, according to the specification
	Instrument not connected to the segment, double assignment of an address	Check and correct, if necessary

In Ex applications, the regulations for the wiring of intrinsically safe circuits must be observed.

? E013

- no measured value available[3)]

→ Exchange the instrument or send it in for repair

Error messages via the indicating and adjustment module

? E017

- Adjustment span too small

→ repeat with modified values

? E036

- no operable sensor software

→ Carry out a software update or send instrument for repair

? E041

- Hardware error, electronics defective

→ Exchange the instrument or send it in for repair

? E113

- Communication conflict

→ Exchange the instrument or send it in for repair

Depending on the reason for the fault and the measures taken, the steps described in chapter "*Set up*" may have to be carried out again.

Reaction after fault rectification

8.3 Calculation of total deviation (according to DIN 16086)

The total deviation F_{total} according to DIN 16086 is the sum of basic accuracy F_{perf} and longterm stability F_{stab}. F_{total} is also called maximum practical deviation or utility error.

Total deviation

$F_{total} = F_{perf} + F_{stab}$

$F_{perf} = \sqrt{((F_T)^2 + (F_{KI})^2)}$

With the analogue signal output there is also the error of the current output F_a.

$F_{perf} = \sqrt{((F_T)^2 + (F_{KI})^2 + (F_a)^2)}$

With:

- F_{total}: Total deviation
- F_{perf}: Basic accuracy
- F_{stab}: Long-term drift
- F_T: Temperature coefficient (influence of medium or ambient temperature)
- F_{KI}: Deviation
- F_a: Error current output

Pressure measurement in the pipeline 8 bar (800 KPa)

Product temperature 50 °C, hence within the compensated range

[3] Fault message can also appear if the pressure is higher than the nominal range.

VEGABAR 52 with measuring range 10 bar

Example

Calculation of the set Turn Down: TD = 10 bar/8 bar, TD = 1.25

Basic accuracy digital output signal in percent:
$F_{perf} = \sqrt{((F_T)^2 + (F_{KI})^2)}$

$F_T = (0.05\ \% + 0.1\ \% \times TD)$

$F_{KI} = 0.075\ \%$

$F_{perf} = \sqrt{((0.05\ \% + 0.1\ \% \times 1.25)^2 + (0.075\ \%)^2)}$

$F_{perf} = 0.19\ \%$

Total deviation digital output signal in percent:
$F_{total} = F_{perf} + F_{stab}$

$F_{stab} = (0.1\ \% \times TD)/year$

$F_{stab} = (0.1\ \% \times 1.25)/year$

$F_{stab} = 0.125\ \%$

$F_{total} = 0.19\ \% + 0.125\ \% = 0.315\ \%$

Total deviation digital output signal absolute:
$F_{total} = 0.315\ \% \times 8\ bar/100\ \% = 25.2\ mbar$

Basic accuracy analogue output signal in percent:
$F_{perf} = \sqrt{((F_T)^2 + (F_{KI})^2 + (F_a)^2)}$

$F_T = (0.05\ \% + 0.1\ \% \times TD)$

$F_{KI} = 0.075\ \%$

$F_a = 0.15\ \%$

$F_{perf} = \sqrt{((0.05\ \% + 0.1\ \% \times 1.25)^2 + (0.075\ \%)^2 + (0.15\ \%)^2)}$

$F_{perf} = 0.24\ \%$

Total deviation analogue output signal in percent:
$F_{total} = F_{perf} + F_{stab}$

$F_{stab} = (0.1\ \% \times TD)/year$

$F_{stab} = (0.1\ \% \times 1.25)/year$

$F_{stab} = 0.125\ \%$

$F_{total} = 0.24\ \% + 0.125\ \% = 0.365\ \%$

Total deviation analogue output signal absolute:
$F_{total} = 0.365\ \% \times 8\ bar/100\ \% = 29.2\ mbar$

8.4 Exchanging the electronics module

In case of a defect, the electronics module can be exchanged by the user against an identical type. If no electronics module is available on side, the module can be ordered from the agency serving you.

Ordering and exchange are possible **with** or **without** sensor serial number. The electronics module **with** serial number includes **order-specific** data such as factory setting, seal material etc. These are not included in the electronics module **without** serial number.

The serial number is stated on the type label of VEGABAR 52 or on the delivery note.

8.5 Software update

The software version of VEGABAR 52 can be determined as follows:

- on the type label of the electronics
- via the indicating and adjustment module
- via PACTware

You can view all software histories on our website www.vega.com. Make use of this advantage and get registered for update information via e-mail.

The following components are required to update the sensor software:

- Sensor
- Voltage supply
- VEGACONNECT
- PC with PACTware
- Current sensor software as file

Load sensor software to PC

At "www.vega.com/downloads" go to "*Software*". Select under "*plics sensors and instruments*", "*Firmware updates*" the respective instrument series and software version. Load the zip file via the right mouse key with "*Save target as*" e.g. on the desktop of your PC. Move with the right mouse key to the folder and select "*Extract all*". Save the extracted files, for example on the desktop.

Prepare update

Connect the signal conditioning instrument to power supply and provide the connection from the PC to the instrument via the interface adapter. Start PACTware and go via the menu "*Project*" to the *VEGA project assistant*. Select "*USB*" and "*Set instruments online*". Activate the project assistant with "*Start*". The assistant establishes the connection automatically and opens the parameter adjustment window "*Sensor # online parameter adjustment*". Connect this parameter adjustment window before you carry out further steps.

Select with the right mouse key the sensor in the project and go to "*Additional function*". Then click to "*Software update*". The window "*Sensor # software update*" opens. PACTware checks now the sensor data and displays the actual hardware and software version of the sensor. This takes approximately 60 s.

Load software into sensor

Push the button "*Update software*" and select the previously extracted hex file. Then the software update can be started. The additional files are installed automatically. Depending on the sensor, this procedure lasts up to 1 h. Then the message appears ""*Software update successfully executed*".

8.6 Instrument repair

If a repair is necessary, please proceed as follows:

You can download a return form (23 KB) from our homepage at www.vega.com under: "*Downloads - Forms and certificates - Repair form*".

By doing this you help us carry out the repair quickly and without having to call back for needed information.

- Print and fill out one form per instrument
- Clean the instrument and pack it damage-proof
- Attach the completed form and, if need be, also a safety data sheet outside on the packaging
- Please ask the agency serving you for the address of your return shipment. You can find the respective agency on our website www.vega.com under: "*Company - VEGA worldwide*"

9 Dismounting

9.1 Dismounting steps

Warning:
Before dismounting, be aware of dangerous process conditions such as e.g. pressure in the vessel, high temperatures, corrosive or toxic products etc.

Take note of chapters "*Mounting*" and "*Connecting to power supply*" and carry out the listed steps in reverse order.

9.2 Disposal

The instrument consists of materials which can be recycled by specialised recycling companies. We use recyclable materials and have designed the electronics to be easily separable.

WEEE directive 2002/96/EG

This instrument is not subject to the WEEE directive 2002/96/EG and the respective national laws. Pass the instrument directly on to a specialised recycling company and do not use the municipal collecting points. These may be used only for privately used products according to the WEEE directive.

Correct disposal avoids negative effects on humans and the environment and ensures recycling of useful raw materials.

Materials: see chapter "*Technical data*"

If you have no way to dispose of the old instrument properly, please contact us concerning return and disposal.

10 Supplement

10.1 Technical data

General data

Parameter, pressure	Gauge pressure, absolute pressure, vacuum
Measuring principle	Ceramic-capacitive, dry measuring cell
Communication interface	I^2C bus

Materials and weights

Material 316L corresponds to 1.4404 or 1.4435

Materials, wetted parts	
– Process fitting	316L, PVDF, Hastelloy C-22, Hastelloy C-276
– Diaphragm	sapphire ceramic® (99.9 % oxide ceramic)
– Joining material diaphragm/Basic element measuring cell	Glass solder
– Measuring cell seal	FKM (VP2/A, A+P70.16), EPDM (A+P 75.5/KW75F), FFKM (Kalrez 6375, Perlast G75S, Perlast G75B)
– Seal, process fitting thread G1½ A	Klingersil C-4400
Materials, non-wetted parts	
– Electronics housing	Plastic PBT (polyester), Alu die-casting powder-coated, 316L
– External electronics housing	plastic PBT (Polyester)
– Socket, wall mounting plate external electronics housing	plastic PBT (Polyester)
– Seal between housing socket and wall mounting plate	TPE (fixed connected)
– Seal, housing cover	NBR (stainless steel housing), silicone (Alu/plastic housing)
– Inspection window in housing cover for indicating and adjustment module	Polycarbonate (UL-746-C listed)
– Ground terminal	316Ti/316L
– Ohmic contact	Between ground terminal and process fitting
– Connection cable between transmitter and external electronics housing with IP 68 version	PUR
– Type label support on connection cable	PE hard
– Connection cable with IP 68 1 bar version	PE
Weight approx.	0.8 … 8 kg (1.764 … 17.64 lbs), depending on process fitting

36719-EN-120324

Output variable

Output signal	digital output signal, format according to IEEE-754
Sensor address	126 (default setting)
Current value	10 mA, ±0.5 mA

Dynamic behaviour output

Run-up time approx.	10 s

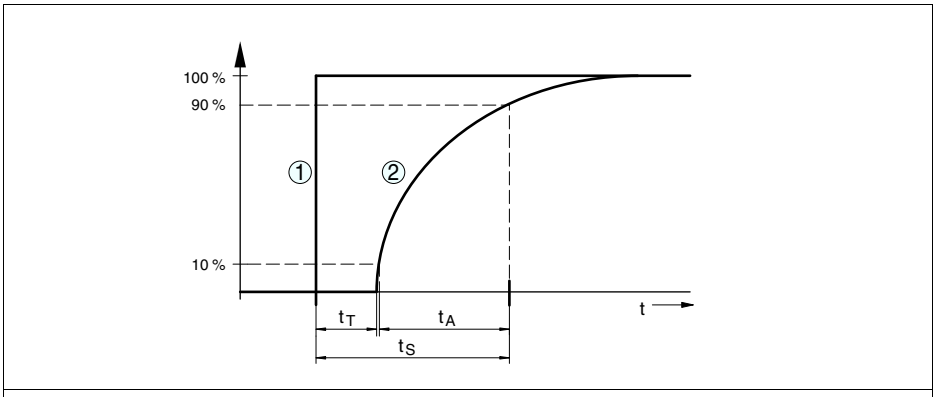


Fig. 26: Sudden change of the process variable. t_T: dead time; t_A: rise time; t_S: jump response time

1 Process variable
2 Output signal

Dead time	≤ 150 ms
Rise time	≤ 100 ms (10 … 90 %)
Step response time	≤ 250 ms (ti: 0 s, 10 … 90 %)
Damping (63 % of the input variable)	0 … 999 s, adjustable

Additional output parameter - temperature

Processing is made via output signal HART multidrop, Profibus PA and Foundation Fieldbus

Range	-50 … +150 °C (-58 … +302 °F)
Resolution	1 °C (1.8 °F)
Accuracy	
– in the range of 0 … +100 °C (+32 … +212 °F)	±3 K
– in the range of -50 … 0 °C (-58 … +32 °F) and +100 … +150 °C (+212 … +302 °F)	typ. ±4 K

Input variable

Adjustment

Adjustment range of the min./max. adjustment relating to the nominal measuring range:

- Percentage value -10 … 110 %
- Pressure value -20 … 120 %

Adjustment range of the zero/span adjustment relating to the nominal measuring range:

- zero -20 … +95 %
- span -120 … +120 %[4)]
- Difference between zero and span max. 120 % of the nominal range

Recommended max. turn down 10 : 1 (no limitation)

Nominal measuring ranges and overload capability in bar/kPa

The specifications are only an overview and refer to the measuring cell. Limitations due to the material and process fitting version are possible. The specifications on the type label apply.

Nominal range	Overload capacity, max. pressure	Overload capacity, min. pressure
Gauge pressure		
0 … +0.1 bar/0 … +10 kPa	+15 bar/+1500 kPa	-0.2 bar/-20 kPa
0 … +0.2 bar/0 … +20 kPa	+20 bar/+2000 kPa	-0.4 bar/-40 kPa
0 … +0.4 bar/0 … +40 kPa	+30 bar/+3000 kPa	-0.8 bar/-80 kPa
0 … +1 bar/0 … +100 kPa	+35 bar/+3500 kPa	-1 bar/-100 kPa
0 … +2.5 bar/0 … +250 kPa	+50 bar/+5000 kPa	-1 bar/-100 kPa
0 … +5 bar/0 … +500 kPa	+65 bar/+6500 kPa	-1 bar/-100 kPa
0 … +10 bar/0 … +1000 kPa	+90 bar/+9000 kPa	-1 bar/-100 kPa
0 … +25 bar/0 … +2500 kPa	+130 bar/+13000 kPa	-1 bar/-100 kPa
0 … +60 bar/0 … +6000 kPa	+200 bar/+20000 kPa	-1 bar/-100 kPa
-1 … 0 bar/-100 … 0 kPa	+35 bar/+3500 kPa	-1 bar/-100 kPa
-1 … +1.5 bar/-100 … +150 kPa	+50 bar/+5000 kPa	-1 bar/-100 kPa
-1 … +5 bar/-100 … +500 kPa	+65 bar/+6500 kPa	-1 bar/-100 kPa
-1 … +10 bar/-100 … +1000 kPa	+90 bar/+9000 kPa	-1 bar/-100 kPa
-1 … +25 bar/-100 … +2500 kPa	+130 bar/+13000 kPa	-1 bar/-100 kPa
-1 … +60 bar/-100 … +6000 kPa	+200 bar/+20000 kPa	-1 bar/-100 kPa
-0.05 … +0.05 bar/-5 … +5 kPa	+15 bar/+1500 kPa	-0.2 bar/-20 kPa
-0.1 … +0.1 bar/-10 … +10 kPa	+20 bar/+2000 kPa	-0.4 bar/-40 kPa
-0.2 … +0.2 bar/-20 … +20 kPa	+30 bar/+3000 kPa	-0.8 bar/-80 kPa
-0.5 … +0.5 bar/-50 … +50 kPa	+35 bar/+3500 kPa	-1 bar/-100 kPa
Absolute pressure		
0 … 0.1 bar/0 … 10 kPa	15 bar/1500 kPa	0 bar abs.
0 … 1 bar/0 … 100 kPa	35 bar/3500 kPa	0 bar abs.
0 … 2.5 bar/0 … 250 kPa	50 bar/5000 kPa	0 bar abs.
0 … 5 bar/0 … 500 kPa	65 bar/6500 kPa	0 bar abs.

[4)] Values less than -1 bar cannot be set.

Nominal range	Overload capacity, max. pressure	Overload capacity, min. pressure
0 … 10 bar/0 … 1000 kPa	90 bar/9000 kPa	0 bar abs.
0 … 25 bar/0 … 2500 kPa	130 bar/13000 kPa	0 bar abs.
0 … 60 bar/0 … 6000 kPa	200 bar/20000 kPa	0 bar abs.

Nominal measuring ranges and overload capacity in psi

The specifications are only an overview and refer to the measuring cell. Limitations due to the material and process fitting version are possible. The specifications on the type label apply.

Nominal range	Overload capacity, max. pressure	Overload capacity, min. pressure
Gauge pressure		
0 … +1.450 psig	+217.6 psig	-2.900 psig
0 … +2.901 psig	+290.1 psig	-5.802 psig
0 … +5.802 psig	+435.1 psig	-11.60 psig
0 … +14.50 psig	+507.6 psig	-14.5 psig
0 … +36.26 psig	+725 psig	-14.50 psig
0 … +72.52 psig	+942.7 psig	-14.50 psig
0 … +14.50 psig	+1305 psig	-14.50 psig
0 … +362.6 psig	+1885 psig	-14.50 psig
0 … +870.2 psig	+2901 psig	-14.50 psig
-14.5 … 0 psig	+507.6 psig	-14.50 psig
-14.5 … +21.76 psig	+725.2 psig	-14.5 psig
-1 … +72.52 psig	+942.7 psig	-14.5 psig
-14.50 … +145.0 psig	+1305 psig	-14.50 psig
-1 … +362.6 psig	+1885 psig	-14.5 psig
-1 … +870.2 psig	+2901 psig	-14.50 psig
-0.725 … +0.725 psig	+217.6 psig	-2.901 psig
-1.450 … +1.450 psig	+290.1 psig	-5.801 psig
-2.901 … +2.901 psig	+435.1 psig	-11.60 psig
-7.252 … +7.252 psig	+507.6 psig	-14.50 psig/-100 kPa
Absolute pressure		
0 … 1.405 psi	217.6 psi	0 psi
0 … 14.5 psi	507.6 psi	0 psi
0 … 36.26 psi	725.2 psi	0 psi
0 … 72.52 psi	942.7 psi	0 psi
0 … 145.0 psi	1305 psi	0 psi
0 … 362.6 psi	1885 psi	0 psi
0 … 870.2 psi	2901 psi	0 psi

Reference conditions and actuating variables (according to DIN EN 60770-1)

Reference conditions according to DIN EN 61298-1

- Temperature: +15 … +25 °C (+59 … +77 °F)
- Relative humidity: 45 … 75 %
- Air pressure: 860 … 1060 mbar/86 … 106 kPa (12.5 … 15.4 psi)

Determination of characteristics	Limit point adjustment according to IEC 61298-2
Characterstic curve	Linear
Reference installation position	upright, diaphragm points downward
Influence of the installation position	< 0.2 mbar/20 Pa (0.003 psig)

Deviation determined according to the limit point method according to IEC 60770[5)]

Applies to the **digital** signal output (HART, Profibus PA, Foundation Fieldbus) as well as to **analogue** current output 4 … 20 mA and refers to the set span. Turn down (TD) is the ratio nominal measuring range/set span.

Deviation with absolutely flush process fittings EV, FT

- Turn down 1 : 1 up to 5 : 1: < 0.05 %
- Turn down > 5 : 1: < 0.01 % x TD

Deviation with version 0.075 %

- Turn down 1 : 1 up to 5 : 1: < 0.075 %
- Turn down > 5 : 1: < 0.015 % x TD

Deviation with version 0.1 %

- Turn down 1 : 1 up to 5 : 1: < 0.1 %
- Turn down > 5 : 1: < 0.02 % x TD

Deviation with version 0.2 %

- Turn down 1 : 1 up to 5 : 1: < 0.2 %
- Turn down > 5 : 1: < 0.04 % x TD

Deviation with absolute pressure measuring range 0.1 bar

- Turn down 1 : 1 up to 5 : 1: < 0.25 %
- Turn down > 5 : 1: < 0.05 % x TD

Influence of the product or ambient temperature

Thermal change zero signal and output span

Applies to the **digital** signal output (HART, Profibus PA, Foundation Fieldbus) as well as to **analogue** current output 4 … 20 mA and refers to the set span. Turn down (TD) is the ratio nominal measuring range/set span.

Thermal change zero signal and output span, reference temperature 20 °C (68 °F):

- In the compensated temperature range 0 … +100 °C (+32 … +212 °F): < (0.05 % + 0.1 % x TD)

5) Incl. non-linearity, hysteresis and non-repeatability.

– Outside the compensated temperature range < (0.05 % + 0.15 % x TD)

Thermal change zero signal and output span with absolute pressure measuring range 0.1 bar, reference temperature 20 °C (68 °F):

– In the compensated temperature range 0 … +100 °C (+32 … +212 °F) < (0.1 % + 0.1 % x TD)
– Outside the compensated temperature range < (0.15 % + 0.15 % x TD)

Thermal change, current output

Applies also to the **analogue** 4 … 20 mA current output and refers to the set span.

Thermal change, current output < 0.05 %/10 K, max. < 0.15 %, each with -40 … +80 °C (-40 … +176 °F)

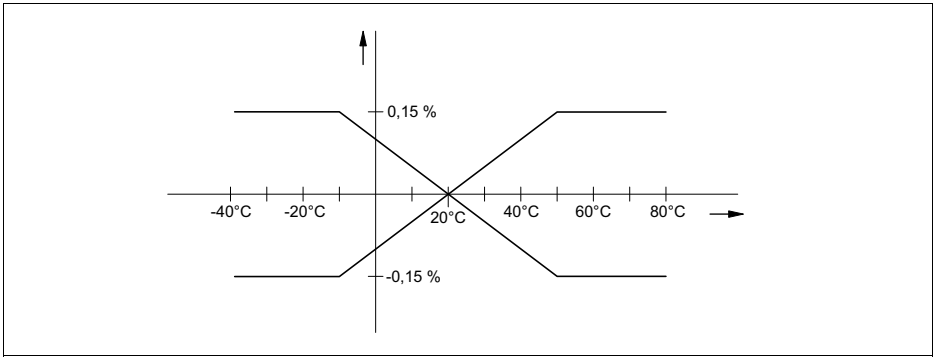


Fig. 27: Thermal change, current output

Long-term stability (according to DIN 16086, DINV 19259-1 and IEC 60770-1)

Applies to **digital** HART interface as well as to **analogue** current output 4 … 20 mA under reference conditions. Specifications refer to the set span. Turn down (TD) is the relation nominal measuring range/set span.

Long-term drift of the zero signal:

– For one year < 0.05 % x TD
– For five years < 0.1 % x TD
– For ten years < 0.2 % x TD

Ambient conditions

Ambient, storage and transport temperature

– Standard version -40 … +80 °C (-40 … +176 °F)
– Versions IP 66/IP 68 (1 bar) and IP 68 (25 bar), connection cable PUR -20 … +80 °C (-4 … +176 °F)
– Version IP 66/IP 68 (1 bar), connection cable PE -20 … +60 °C (-4 … +140 °F)

Process conditions

The specifications of the pressure stage and product temperature are used as an overview. The specifications on the type label are applicable.

Pressure stage, process fitting

– Thread 316L	PN 60
– Thread Aluminium	PN 25
– Thread PVDF	PN 10
– Hygienic fittings 316L	PN 6, PN 10, PN 25, PN 40
– Flange 316L	PN 16, PN 40,150 lbs, 300 lbs, 600 lbs
– Flange with extension 316L	without PN specification, PN 16, PN 40 or 150 lbs, 300 lbs, 600 lbs
– Flange flattened on both sides 316L	PN 10
– Flange PVDF	PN 16

Product temperature depending on the measuring cell seal[6)]

Measuring cell seal	Product temperature - standard version	Product temperature - version with extended temperature range
FKM (VP2/A)	-20 … +120 °C (-4 … +248 °F)	-20 … +150 °C (-4 … +302 °F)
FKM (A+P 70.16)	-40 … +120 °C (-40 … +248 °F)	-
EPDM (A+P 75.5/KW75F)	-40 … +120 °C (-40 … +248 °F) 1 h: 140 °C/284 °F cleaning temperature	-40 … +150 °C (-40 … +302 °F)
EPDM (ET 7056)	-40 … +120 °C (-40 … +248 °F) 1 h: 140 °C/284 °F cleaning temperature	-
FFKM (Kalrez 6375)	-20 … +120 °C (-4 … +248 °F)	-20 … +150 °C (-4 … +302 °F)
FFKM (Perlast G75S)	-15 … +120 °C (-4 … +248 °F)	-15 … +150 °C (5 … +302 °F)
FFKM (Perlast G75B)	-15 … +120 °C (-4 … +248 °F)	-15 … +150 °C (5 … +302 °F)

Vibration resistance	mechanical vibrations with 4 g and 5 … 100 Hz[7)]
Shock resistance	Acceleration 100 g/6 ms[8)]

6) With process fitting PVDF, max. 100 °C (212 °F).
7) Tested according to the guidelines of German Lloyd, GL directive 2.
8) Tested according to EN 60068-2-27.

Electromechanical data - version IP 66/IP 67	
Cable entry/plug[9]	
– Single chamber housing	• 1 x cable gland M20 x 1.5 (cable: ø 5 … 9 mm), 1 x blind stopper M20 x 1.5 or: • 1 x closing cap ½ NPT, 1 x blind plug ½ NPT or: • 1 x plug (depending on the version), 1 x blind stopper M20 x 1.5 or: • 2 x blind stopper M20 x 1,5
– Double chamber housing	• 1 x cable entry M20 x 1.5 (cable: ø 5 … 9 mm), 1 x blind stopper M20 x 1.5; plug M12 x 1 for the external indicating and adjustment unit (optional) or: • 1 x closing cap ½ NPT, 1 x blind stopper ½ NPT, plug M12 x 1 for the external indicating and adjustment unit (optional) or: • 1 x plug (depending on the version), 1 x blind stopper M20 x 1.5; plug M12 x 1 for the external indicating and adjustment unit (optional) or: • 2 x blind stoppers M20 x 1.5; plug M12 x 1 for the external indicating and adjustment unit (optional)
Spring-loaded terminals for wire cross-section	< 2.5 mm² (AWG 14)

Electromechanical data - version IP 66/IP 68 (1 bar)	
Cable entry	
– Single chamber housing	• 1 x IP 68 cable gland M20 x 1.5; 1 x blind stopper M20 x 1.5 or: • 1 x closing cap ½ NPT, 1 x blind plug ½ NPT
Connection cable	
– Structure	four wires, one suspension cable, one breather capillary, screen braiding, metal foil, mantle
– Wire cross-section	0.5 mm² (AWG 20)
– Wire resistance	< 0.036 Ω/m (0.011 Ω/ft)
– Tensile strength	> 1200 N (270 pounds force)

[9] Depending on the version M12 x 1, according to ISO 4400, Harting, 7/8" FF.

– Standard length	5 m (16.4 ft)
– Max. length	1000 m (3281 ft)
– Min. bending radius at 25 °C/77 °F	25 mm (0.985 in)
– Diameter approx.	8 mm (0.315 in)
– Colour - Non-Ex version	Black
– Colour - Ex-version	Blue

Electromechanical data - version IP 68

Connection cable between IP 68 instrument and external housing:

– Structure	four wires, one suspension cable, one breather capillary, screen braiding, metal foil, mantle
– Wire cross-section	0.5 mm^2 (AWG 20)
– Wire resistance	< 0.036 Ω/m (0.011 Ω/ft)
– Standard length	5 m (16.40 ft)
– Max. length	180 m (590.5 ft)
– Min. bending radius at 25 °C/77 °F	25 mm (0.985 in)
– Diameter approx.	8 mm (0.315 in)
– Colour	Blue
Cable entry/plug[10)]	
– External housing	• 1 x cable gland M20 x 1.5 (cable: ø 5 … 9 mm), 1 x blind stopper M20 x 1.5 or: • 1 x plug (depending on the version), 1 x blind stopper M20 x 1.5
Spring-loaded terminals for wire cross-section up to	2.5 mm^2 (AWG 14)

Indicating and adjustment module

Voltage supply and data transmission	through the sensor
Indication	LC display in dot matrix
Adjustment elements	4 keys
Protection rating	
– unassembled	IP 20
– mounted into the sensor without cover	IP 40
Materials	
– Housing	ABS
– Inspection window	Polyester foil

Voltage supply

Operating voltage

[10)] Depending on the version M12 x 1, according to ISO 4400, Harting, 7/8" FF.

– Non-Ex instrument	9 … 32 V DC
– Ex ia instrument	9 … 24 V DC
– Ex d instrument	14 … 32 V DC

Operating voltage with illuminated indicating and adjustment module

– Non-Ex instrument	18 … 32 V DC
– Ex ia instrument	18 … 24 V DC
– Ex id instrument	18 … 32 V DC
Max. number of sensors on the DP/PA segment coupler non-Ex/Ex	32/10

Electrical protective measures

Protection rating

– Housing, standard	IP 66/IP 67[11]
– Aluminium and stainless housing (optionally available)	IP 68 (1 bar)[12]
– Process component in IP 68 version	IP 68 (25 bar)
– External housing	IP 65
Overvoltage category	III
Protection class	II

Approvals

Instruments with approvals can have different technical data depending on the version.

That's why the associated approval documents have to be noted with these instruments. They are part of the delivery or can be downloaded under www.vega.com via "*VEGA Tools*" and "*serial number search*" as well as via "*Downloads*" and "*Approvals*".

[11] Instruments with gauge pressure measuring ranges cannot detect the ambient pressure when submerged, e.g. in water. This can lead to falsification of the measured value.

[12] Only with instruments with absolute pressure ranges.

10.2 Information on Profibus PA

Instrument master file

The instrument master file (GSD) contains the characteristic data of the Profibus PA instrument. These data are, e.g. the permissible transmission rates as well as information on diagnostics values and the format of the measured value outputted by the PA instrument.

A bitmap file is also provided for the Profibus network planning tool. This file is installed automatically when the GSD file is integrated. The bitmap file is used for symbolic indication of the PA instrument in the configuration tool.

Ident number

Each Profibus instrument gets an unambiguous ident number (ID number) from the Profibus user organisation (PNO). This ID number is also included in the name of the GSD file. For VEGABAR 52 the ID number is **0 x 076F(hex)** and the GSD file **BR__076F.GSD**. As an option to this manufacturer-specific GSD file, PNO provides also a general so-called profile-specific GSD file. For VEGABAR 52 you have to use the general GSD file **PA139701.GSD**. If the general GSD file is used, the sensor must be set to the profile-specific ident number via the DTM software. By default, the sensor operates with the manufacturer-specific ID number.

Note:
When using the profile-specific GSD file, the PA-OUT value as well as the temperature value are transmitted to the PLC (see block diagram "*Cyclical data traffic*").

Cyclical data traffic

The master class 1 (e.g. PLC) cyclically reads out measured values from the sensor during operation. The below block diagram below shows which data can be accessed by the PLC.

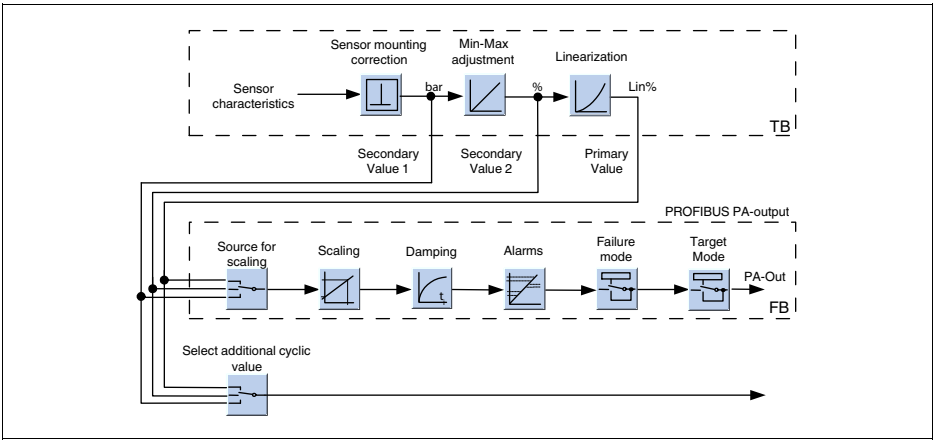


Fig. 28: VEGABAR 52: Block diagram with AI (PA-OUT) value and Additional Cyclic Value

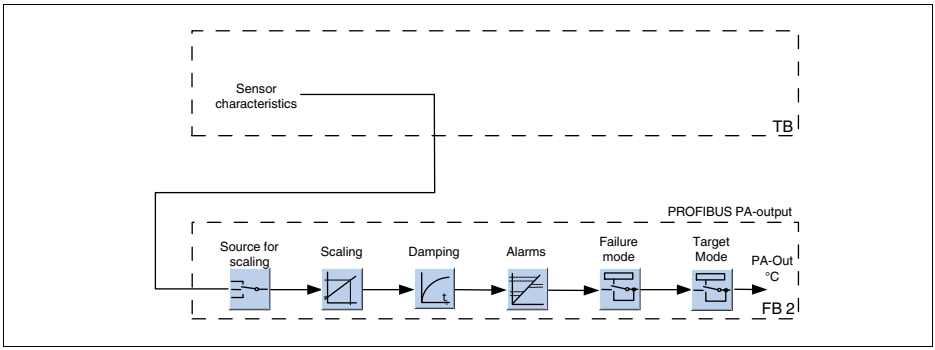


Fig. 29: VEGABAR 52: Block diagram with temperature value

Module of the PA sensors

For the cyclic data traffic, VEGABAR 52 provides the following modules:

- AI (PA-OUT)

— PA-OUT value of the FB1 after scaling

- Temperature

— PA-OUT value of the FB2 after scaling

- Additional Cyclic Value

— Additional cyclical value (depending on the source)

- Free Place

— This module must be used if a value should not be used in the data telegram of the cyclical data traffic (e.g. replacement of the temperature and Additional Cyclic Value)

A maximum of three modules can be active. By means of the configuration software of the Profibus master you can determine the configuration of the cyclical data telegram with these modules. The procedure depends on the respective configuration software.

Tip:
The modules are available in two versions:

- Short for Profibus master supporting only one "Identifier Format" byte, e.g. Allen Bradley
- Long for Profibus master only supporting the "Identifier Format" byte, e.g. Siemens S7-300/400

Examples of telegram configuration

In the following you will see how the modules can be combined and how the appendant data telegram is structured.

Example 1 (standard setting) with pressure value, temperature value and additional cyclical value:

- AI (PA-OUT)
- Temperature
- Additional Cyclic Value

Byte-No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Format	IEEE-754-Flieskommazahl				Status	IEEE-754-Flieskommazahl				Status	IEEE-754-Flieskommazahl				Status
Value	PA-OUT (FB1)				Status (FB1)	Temperature (FB2)				Status (FB2)	Additional Cyclic Value				Status

Fig. 30: Telegram configuration example 1

Example 2 with pressure value and temperature value without additional cyclical value:

- AI (PA-OUT)
- Temperature
- Free Place

Byte-No.	1	2	3	4	5	6	7	8	9	10
Format	IEEE-754-Flieskommazahl				Status	IEEE-754-Flieskommazahl				Status
Value	PA-OUT (FB1)				Status (FB1)	Temperature (FB2)				Status (FB2)

Fig. 31: Telegram configuration example 2

Example 3 with pressure value and additional cyclical value without temperature value:

- AI (PA-OUT)
- Free Place
- Additional Cyclic Value

Byte-No.	1	2	3	4	5	6	7	8	9	10
Format	IEEE-754-Floating point value				Status	IEEE-754-Floating point value				Status
Value	PA-OUT (FB1)				Status (FB1)	Additional Cyclic Value				Status

Fig. 32: Telegram configuration example 3

Data format of the output signal

Byte4	Byte3	Byte2	Byte1	Byte0
Status	Value (IEEE-754)			

Fig. 33: Data format of the output signal

The status byte corresponds to profile 3.0 "Profibus PA Profile for Process Control Devices" coded. The status "Measured value OK" is coded as 80 (hex) (Bit7 = 1, Bit6 … 0 = 0).

The measured value is transferred as a 32 bit floating point number in the IEEE-754 format.

Byte n								Byte n+1								Byte n+2								Byte n+3							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
VZ	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	2^{-1}	2^{-2}	2^{-3}	2^{-4}	2^{-5}	2^{-6}	2^{-7}	2^{-8}	2^{-9}	2^{-10}	2^{-11}	2^{-12}	2^{-13}	2^{-14}	2^{-15}	2^{-16}	2^{-17}	2^{-18}	2^{-19}	2^{-20}	2^{-21}	2^{-22}	2^{-23}
Sign Bit	Exponent							Significant								Significant								Significant							

$$\text{Value} = (-1)^{VZ} \bullet 2^{(\text{Exponent} - 127)} \bullet (1 + \text{Significant})$$

Fig. 34: Data format of the measured value

Coding of the status byte associated with the PA output value

Status code	Description according to Profibus standard	Possible cause
0 x 00	bad - non-specific	Flash-Update active
0 x 04	bad - configuration error	● Adjustment error ● Configuration error with PV-Scale (PV-Span too small) ● Unit irregularity ● Error in the linearization table
0 x 0C	bad - sensor failure	● Hardware error ● Converter error ● Leakage pulse error ● Trigger error
0 x 10	bad - sensor failure	● Measured value generation error ● Temperature measurement error
0 x 1f	bad - out of service constant	"Out of Service" mode switched on
0 x 44	uncertain - last unstable value	Failsafe replacement value (Failsafe-Mode = "Last value" and already valid measured value since switching on)
0 x 48	uncertain substitute set	● Switch on simulation ● Failsafe replacement value (Failsafe-Mode = "Fsafe value")

Status code	Description according to Profibus standard	Possible cause
0 x 4c	uncertain - initial value	Failsafe replacement value (Failsafe-Mode = "Last valid value" and no valid measured value since switching on)
0 x 51	uncertain - sensor; conversion not accurate - low limited	Sensor value < lower limit
0 x 52	uncertain - sensor; conversion not accurate - high limited	Sensor value > upper limit
0 x 80	good (non-cascade) - OK	OK
0 x 84	good (non-cascade) - active block alarm	Static revision (FB, TB) changed (10 sec. active, after the parameter of the static category has been written)
0 x 89	good (non-cascade) - active advisory alarm - low limited	Lo-Alarm
0 x 8a	good (non-cascade) - active advisory alarm - high limited	Hi-Alarm
0 x 8d	good (non-cascade) - active critical alarm - low limited	Lo-Lo-Alarm
0 x 8e	good (non-cascade) - active critical alarm - high limited	Hi-Hi-Alarm

10.3 Dimensions

The following dimensional drawings represent only an extract of the possible versions. Detailed dimensional drawings can be downloaded on www.vega.com under "*Downloads*" and "*Drawings*".

The two chamber housings are not available with instruments with 4 … 20 mA signal output

Plastic housing

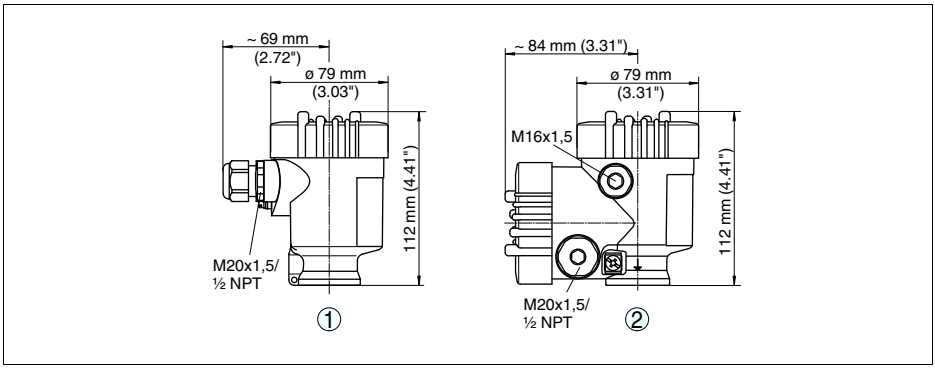


Fig. 35: Housing versions in protection IP 66/IP 68 (0.2 bar) - with integrated indicating and adjustment module the housing is 9 mm/0.35 in higher

1 Single chamber version
2 Double chamber version

Aluminium housing

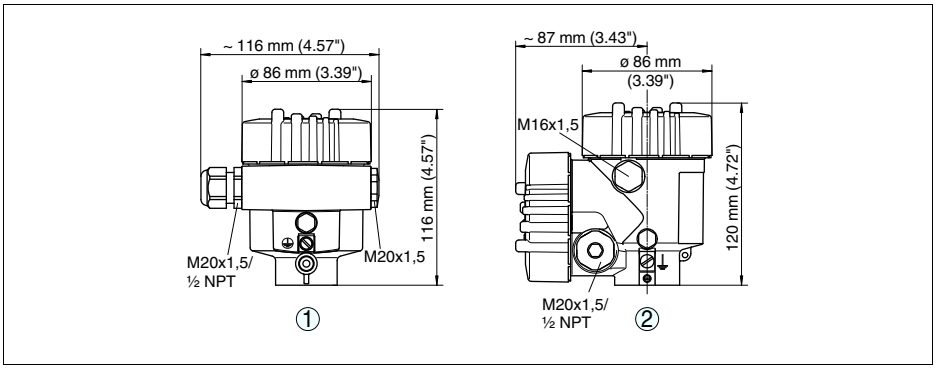


Fig. 36: Housing versions in protection IP 66/IP 68 (0.2 bar) - with integrated indicating and adjustment module the housing is 9 mm/0.35 in higher

1 Single chamber version
2 Double chamber version

Aluminium housing in protection rating IP 66/IP 68 (1 bar)

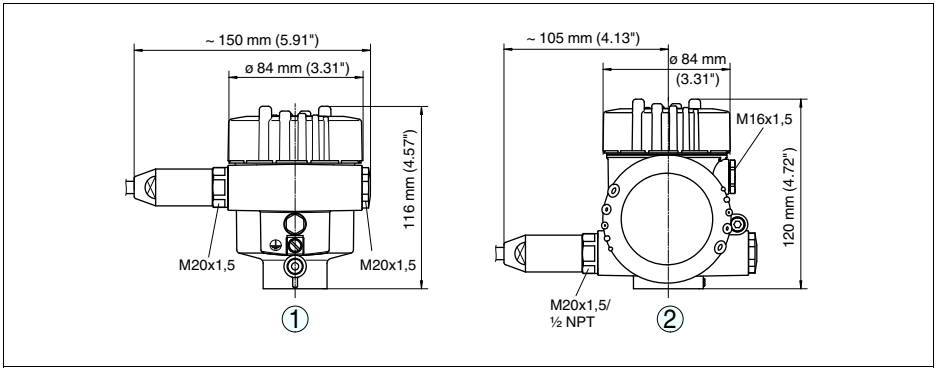


Fig. 37: Housing versions in protection IP 66/IP 68 (1 bar) - with integrated indicating and adjustment module the housing is 9 mm/0.35 in higher

1 Single chamber version
2 Double chamber version

Stainless steel housing

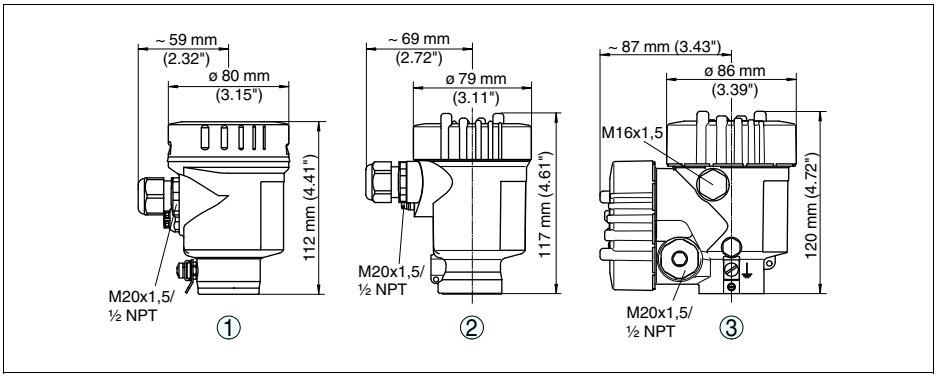


Fig. 38: Housing versions in protection IP 66/IP 68 (0.2 bar) - with integrated indicating and adjustment module the housing is 9 mm/0.35 in higher

1 Single chamber version, electropolished
2 Single chamber version, precision casting
2 Double chamber version, precision casting

Stainless steel housing in protection rating IP 66/IP 68 (1 bar)

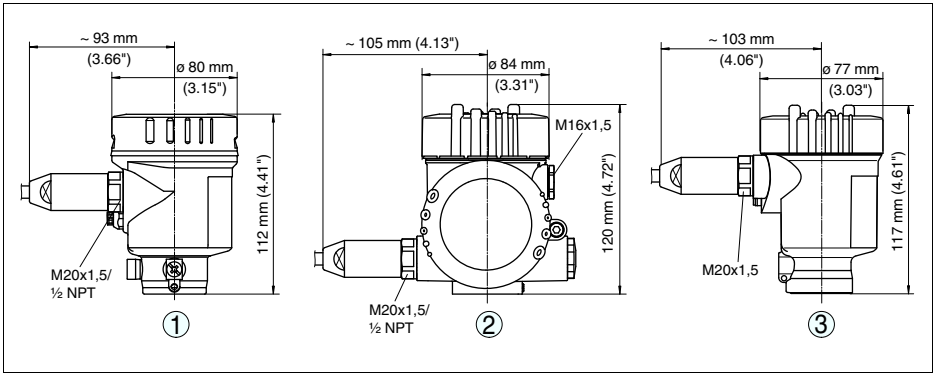


Fig. 39: Housing versions in protection IP 66/IP 68 (1 bar) - with integrated indicating and adjustment module the housing is 9 mm/0.35 in higher

1 Single chamber version, electropolished
2 Single chamber version, precision casting
2 Double chamber version, precision casting

External housing with version IP 68

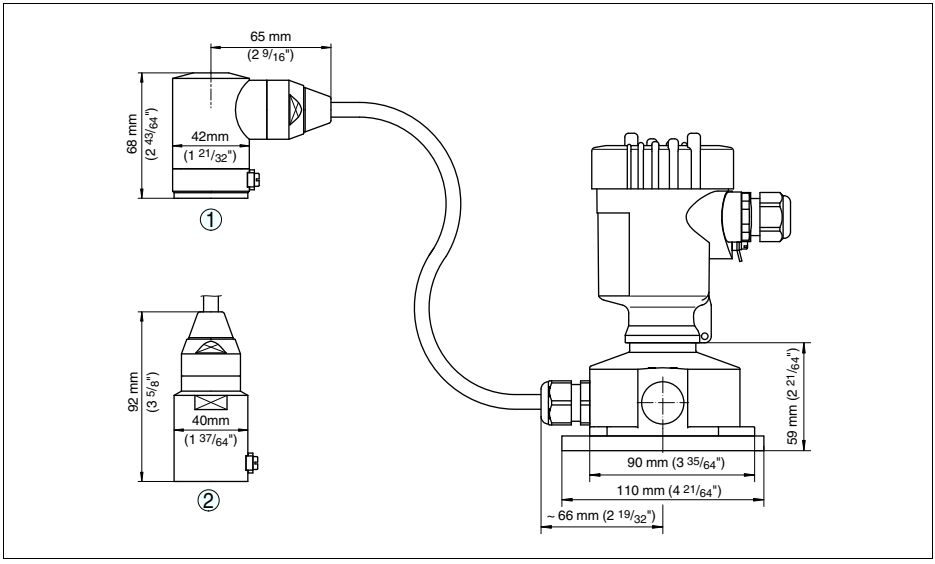


Fig. 40: IP 68 version with external housing - non-Ex

1 Lateral cable outlet
2 Axial cable outlet

VEGABAR 52 - threaded fitting 1

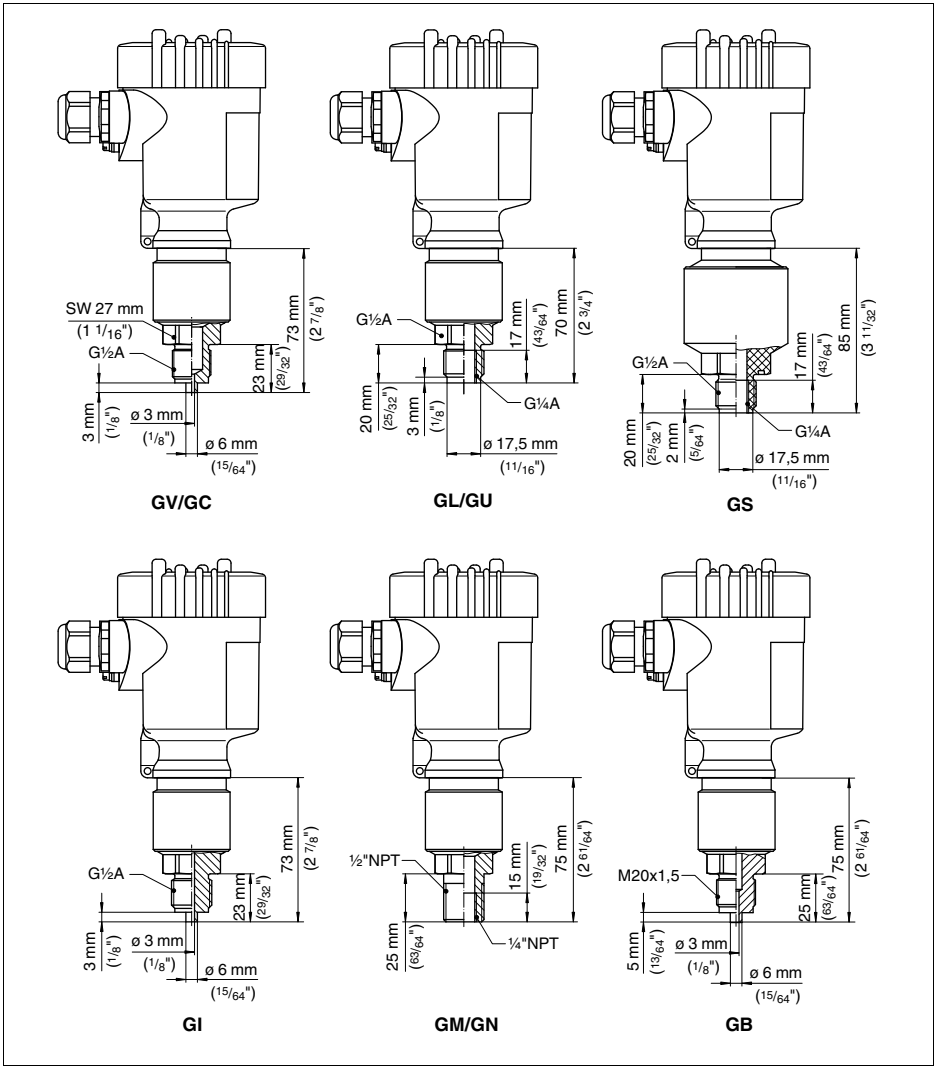


Fig. 41: VEGABAR 52 - threaded fitting: GV/GC = G½ A manometer connection EN 837, GL/GU = G½ A inner G¼ A, GS = G½ A inner G¼ A PVDF, GI = G½ A manometer connection volume-reduced, GM/GN = ½ NPT, GB = M20 x 1.5 manometer connection EN 837

VEGABAR 52 - threaded fitting 2

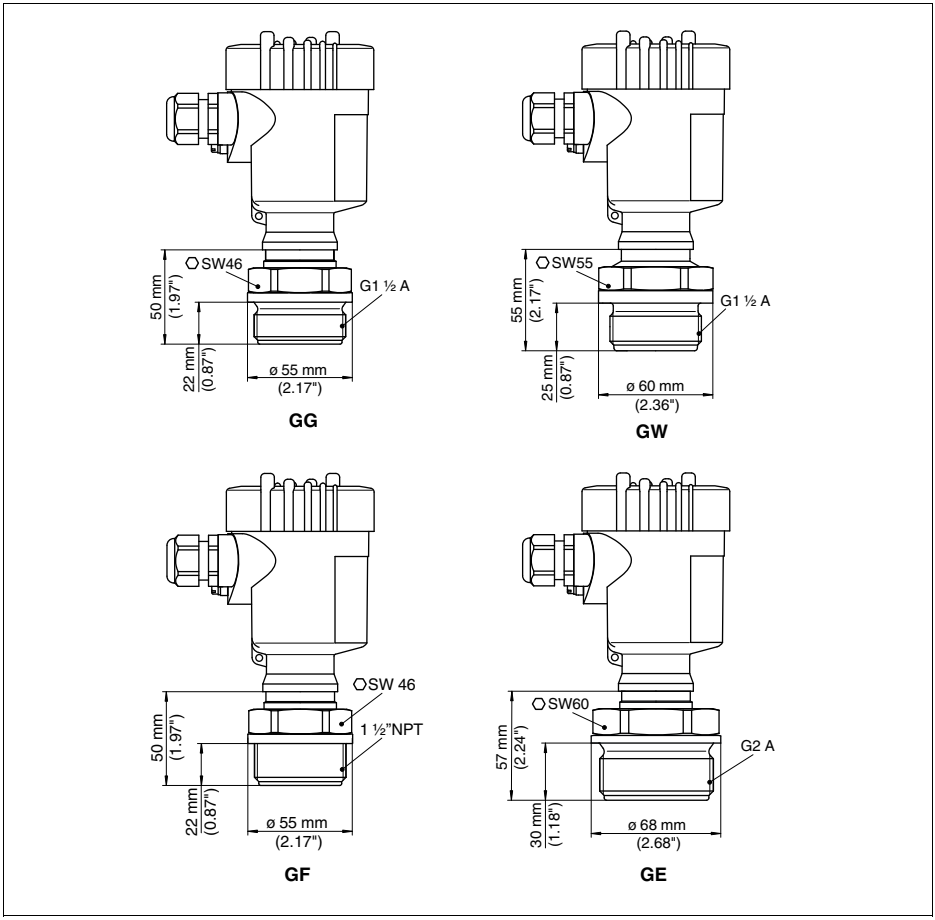


Fig. 42: VEGABAR 52 - threaded fitting: GG = G1½ A, GW = G1½ A PVDF, GN = 1½ NPT, GE = G2 A

For the version with temperature range up to 150 °C/302 °F, the measure of length increases by 28 mm (1.1 in).

VEGABAR 52, hygienic fitting 1

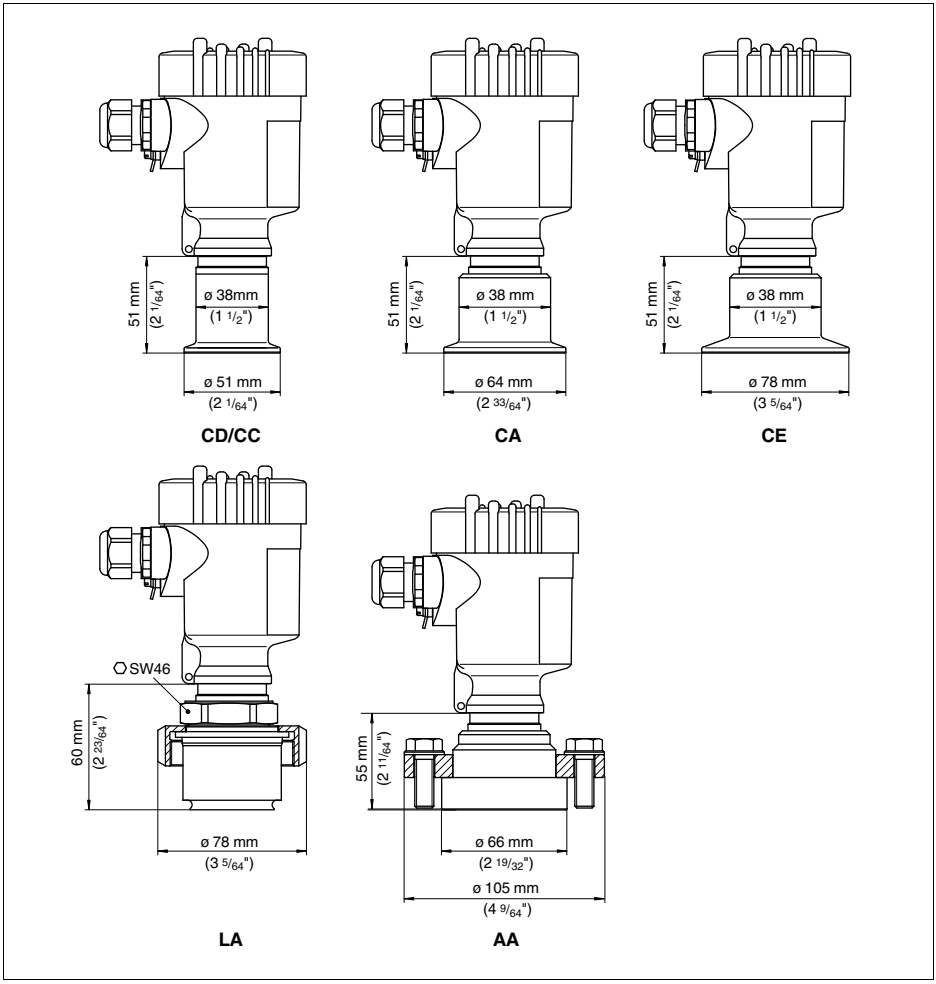


Fig. 43: VEGABAR 52 - hygienic fitting: CD/CC = Clamp 1"/Clamp 1½" acc. to DIN 32676, ISO 2852/316L, CA = Clamp 2", CA = Clamp 2½", LA = hygienic fitting with compression nut F40, AA = DRD

VEGABAR 52, hygienic fitting 2

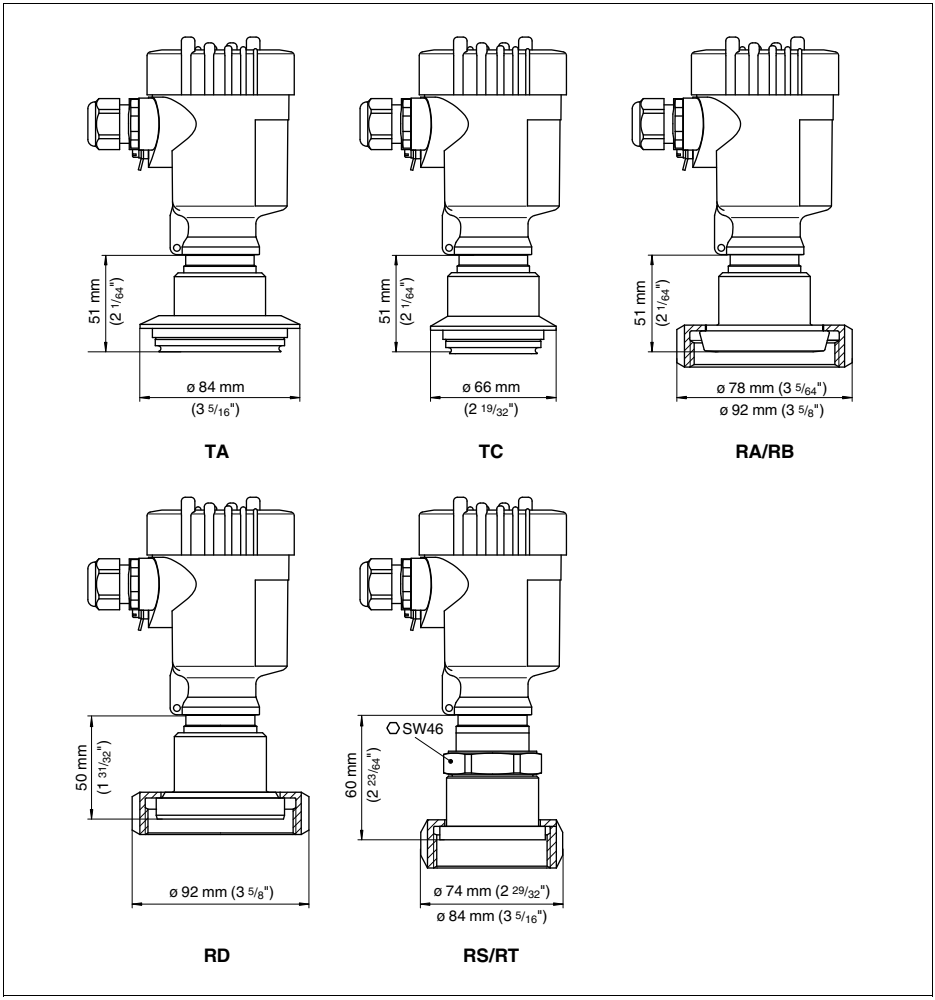
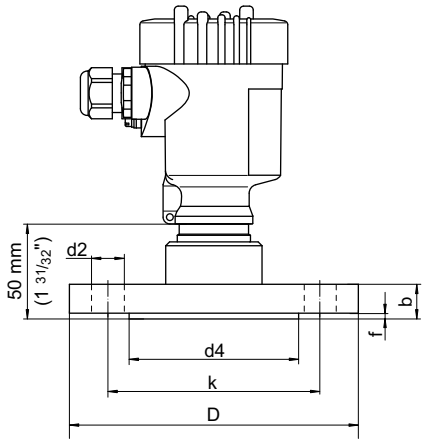


Fig. 44: VEGABAR 52 - hygienic fitting: TA = Tuchenhagen Varivent DN 32, TB = Tuchenhagen Varivent DN 25, RA/RB = bolting DN 40/DN 50 according to DIN 11851, RD = bolting DN 50 according to DIN 11864, RS/RT = SMS DN 38/DN 51

VEGABAR 52 - flange connection



	mm	DN	PN	D	b	k	d2	d4	f
①	EA	40	40	150	18	110	4xø18	88	3
	FB	50	40	165	20	125	4xø18	102	3
	FE	80	40	200	24	160	8xø18	138	3
②	FH	50	150 lbs	6"	3/4"	4 3/4"	4xø 5/8"	3 5/8"	1/8"
	FI	100	150 lbs	460	28	410	12x ø26	380	3

	inch	DN	PN	D	b	k	d2	d4	f
①	EA	40	40	5 29/32"	45/64"	4 21/64"	4xø 45/64"	3 15/32"	1/8"
	FB	50	40	6 1/2"	25/32"	4 59/64"	4xø 45/64"	4 1/64"	1/8"
	FE	80	40	7 7/8"	15/16"	6 19/64"	8xø 45/64"	5 7/16"	1/8"
②	FH	2"	150 lbs	6"	3/4"	4 3/4"	4xø 5/8"	3 5/8"	1/8"
	FI	3"	150 lbs	18 7/64"	1 7/64"	16 9/64"	12xø 45/64"	15"	1/8"

Fig. 45: VEGABAR 52 - flange connection

1 Flange connection according to DIN 2501
2 Flange fitting according to ANSI B16.5

VEGABAR 52 - threaded fitting for paper industry

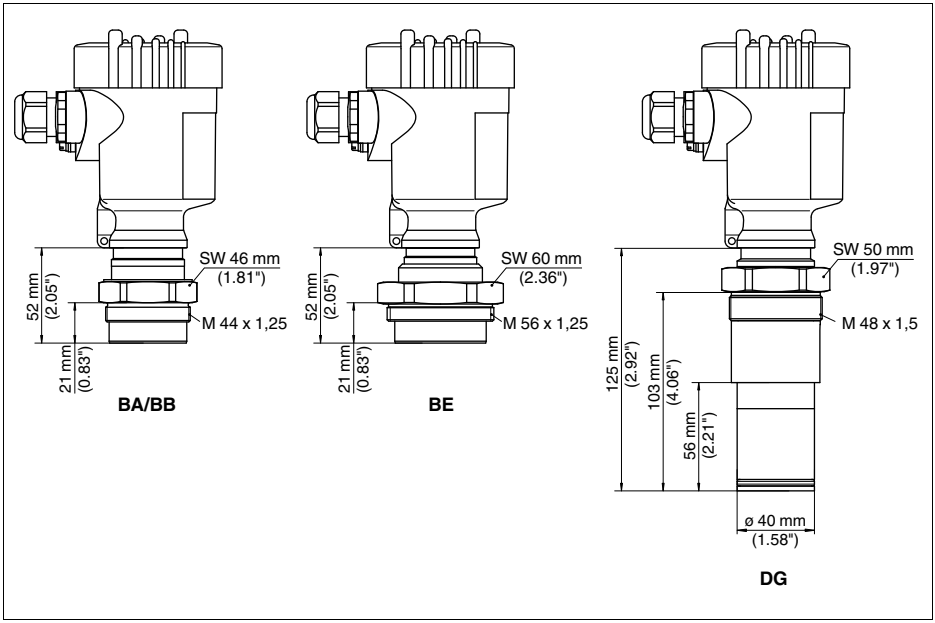


Fig. 46: VEGABAR 52 - threaded fitting for the paper industry: BA/BB = M44 x 1.25, BE = M56 x 1.25, DG = M48 x 1.25 with extension D 40 mm

VEGABAR 52 - flange connection for paper industry 1

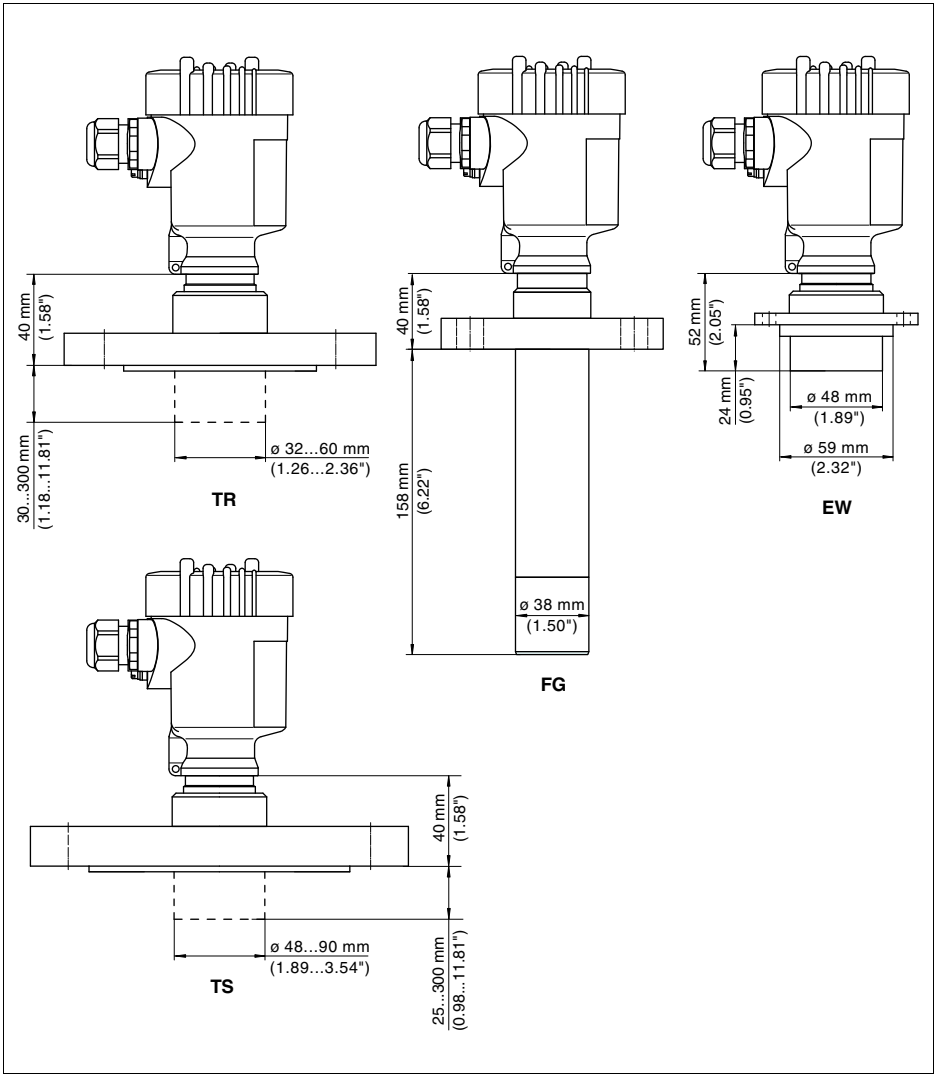


Fig. 47: VEGABAR 52 - flange connection for the paper industry: TR = flange DN 50 with selectable tube, TS = flange DN 80 with selectable tube, FG = flange tube for ball valve fitting, EW = flange for manometer lug

VEGABAR 52 - flange connection for paper industry 2

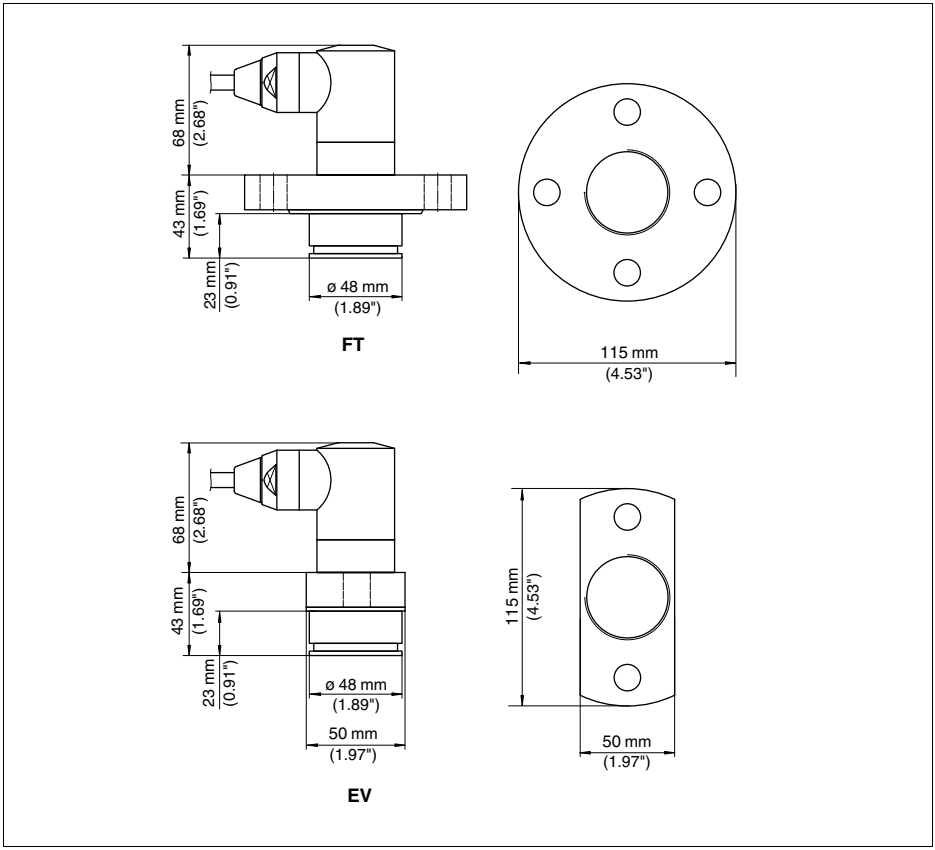


Fig. 48: VEGABAR 52 - flange connection for the paper industry: FT = absolutely front-flush for headbox, EV = absolutely front-flush for headbox (flange 2-times flattened)

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INDEX

A
Accessory
- External indicating and adjustment unit 11
- Flanges 11
- Indicating and adjustment module 10
- Interface adapter 10
- Measuring instrument holder 11
- Protective cover 11

Application area 8

B
Bus communication 9

C
Check signal 36
Connection compartment 23
- Double chamber 21

Connection VEGACONNECT
- directly on the sensor 34
- externally 34

D
Data format output signal 56
Disposal 42

E
Electronics and connection compartment 20
Electronics compartment
- Double chamber 21-22

F
Fault rectification 36

G
GSD 53
GSD/EDD 9

H
Hotline 36

M
Maintenance 36
Moisture 12
Mounting external housing 14
Mounting position 12

P
PA modules 54
Pressure compensation 12
Process conditions 12
Profibus ident number 53

R
Read out measurement data 53
Recycling 42
Repair form 41
Replacement parts
- Electronics module 11

Return form 41

S
Safety data sheet 41
Seal concept 9
Service hotline 36
Status byte 56

T
Telegram configuration 54
Temperature limits 13
Total deviation 38
Type label 8

W
WEEE directive 42
Wiring plan
- Double chamber housing 22
- External electronics 26
- Single chamber housing 20

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